Babcock & Wilcox

a McDermott company

Suite 410
7401 West Mansfield Avenue
Lakewood, CO 80235
(303) 988-8203

June 13, 1994

After receiving this I called John Doyle to discuss:
(1) Want a lower price
(2) Want one year test, not 6 months
(3) Don't want a purchase agreement
I've attached Doyle's follow up letter.

Mr. Cecil James
Intermountain Power Service Corp.
850 W. Brush Wellman Road
Delta, UT 84624-9546

RE: Rotating Throats for MPS Pulverizer
Babcock & Wilcox Reference #Q22-8205

Dear Cecil,

I appreciate the opportunity that you and your fellow employees provided Babcock & Wilcox by allowing us to present the latest developments in B&W's rotating throat upgrade program. As a follow-up to our meeting on 5-24-94, the following information has been prepared.

Babcock & Wilcox is prepared to offer one complete rotating throat assembly for installation in one of your MPS-89G pulverizers for a sell price of $37,500.00, F.O.B. Point of Manufacture. This offer includes a money-back guarantee. If the test mill does not perform as well as it had performed with the stationary throat, or if it does not provide mechanical reliability equal to that of the stationary throat, Intermountain can remove the assembly and return it to Babcock & Wilcox within six (6) months from the date of installation, or twelve (12) months from the date of delivery, for a full refund.

Testing (including primary air calibration) will be run by IPSC and B&W prior to installation of the rotating throat to establish baseline stationary throat performance, and again after installation of the rotating throat to determine if the guarantee has been met.

Babcock & Wilcox is willing to make this offer because we are confident that the benefits realized from the installation of this throat will enable you to justify the purchase of additional assemblies for the balance of the mills.

Since we are willing to offer the above money-back guarantee, we would like you to agree to issue a purchase order to B&W for 15 rotating throat assemblies to be supplied over a four (4) year period should the test throat meet the required guarantees.

IP12_001587

Because you have stated that the stationary upper throat segments and ledge covers require replacement every four (4) years, we would propose to supply three (3) rotating throat assemblies during the first year, with four (4) assemblies to be supplied in each of the three (3) remaining years.

Babcock & Wilcox would maintain the $37,500.00 sell price over the four (4) year period. Intermountain would only be invoiced for each assembly after its delivery.

To make the offer more attractive to you, we could supply individual throat assemblies during the year to meet your projected installation schedule. We could also have one throat assembly available for emergency situations when a mill overhaul had not been anticipated.

As an added incentive, Babcock & Wilcox would be willing to provide a total of five (5) days of Field Service time at no charge, along with the 15 throat assemblies. These five (5) days would be in addition to the time spent by Babcock & Wilcox running mill performance tests and assisting with the installation of the test throat.

At this time, I would make a conservative estimate that the lead-time for delivery of this first assembly would be 26 weeks. This is a worst-case senario, assuming no existing components from the Orland Utilities throat assembly could be used. Once we obtain the requested mill performance data from you, we can size the required port area and determine how much of the existing design can be used. Once we know this, we can re-evaluate our lead-time.

You have stated that you would like to visit a plant which has installed a Babcock & Wilcox rotating throat assembly similar to that which we are proposing to Intermountin. The only customer to install a throat assembly that includes weldment thoat segments with replaceable cast air foil vanes is Orlando Utilities, at their Stanton Energy Center. Their throat segments, however, are bolted to the side of the ring seat, as opposed to being welded to the ring seat, and the vanes are oriented in such a way as to promote CCW air flow in the mill, as opposed to the CW orientation being proposed to Intermountain.

Babcock & Wilcox has talked to the plant engineer at the Stanton Energy Center, and he said that their second B&W rotating throat assembly went into service last week. They plan to install their third B&W assembly in July of this year, and they would welcome a visit from Intermountain at that time.

Once you have had the opportunity to review this information, please give me a call and we can discuss any futher questions you may have, and establish what actions should be taken next.

Sincerely,

BABCOCK & WILCOX COMPANY

John B. Doyle
Sales Engineer

JBD:mt
1239

Babcock & Wilcox

a McDermott company

Suite 410
7401 West Mansfield Avenue
Lakewood, CO 80235
(303) 988-8203

July 19, 1994

Mr. Cecil James
Intermountain Power Service Corp.
850 W. Brush Wellman Road
Delta, UT 84624-9546

RE: Rotating Throats for MPS Pulverizer
Babcock & Wilcox Reference #Q22-8205

Dear Cecil,

The following options to the Babcock & Wilcox quote (6-13-94) are being offered in response to your requests.

OPTION #1: Extend the Trial Period to twelve (12) months from date of installation, or fifteen (15) months from date of delivery. (No price change.)

OPTION #2: Extend the purchase period for buying the fifteen (15) remaining throats to five (5) years. This would be based on purchasing three (3) throats per year.

Babcock & Wilcox will maintain the sell price of $37,500.00 per throat for the initial test throat and the next three (3) throats ordered. The remaining twelve (12) throats would be subject to price increases based on the Producer Price Index 332 INS. If this index increases by more than 10% between the date of award and three months prior to the release for fabrication, the price for the remaining assemblies is subject to increase. Babcock & Wilcox would provide new pricing no later than 30 days prior to release for fabrication. Intermountain would then have the opportunity to accept or reject the new pricing.

For scheduling purposes, the acceptance of Option #2 would result in the following: (This is based on acceptance of the test unit.)

- Manufacture, ship and bill for three (3) throats upon acceptance of test throat.

- Ship three (3) assemblies per year for the next four (4) years, on the anniversary date of the acceptance of the test throat.

  Note: All invoicing will be made upon delivery.

I trust this information will satisfy your requests; if you have any questions, please give me a call.

Sincerely,

BABCOCK & WILCOX COMPANY

John B. Doyle

John B. Doyle
Sales Engineer

JBD:mt
1266

Babcock & Wilcox
a McDermott company

Power Generation Group
20 S. Van Buren Avenue
P.O. Box 351
Barberton, OH 44203-0351
(216) 753-4511

July 26, 1994

Attention: Mr. Cecil James
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, UT 84624

Dear Cecil:

I tried to contact you today to discuss the loading rod failure problem you have been experiencing. Because you were not at the plant this week, I decided to forward the information to you via letter so that you could review it prior to having any discussion.

I have attached a copy of the July 14, 1994 letter I forwarded to Pulverizer Design requesting comments regarding the above problem along with suggestions relating to blocking stationary throat ports to minimize coal spillage. I thought it would be best for you to see my letter so that you would know if I correctly described the two (2) problems. In this letter I mentioned that you were going to try to identify how many ports were blocked in the problem mill, along with their locations relative to the roll wheel assemblies and air inlet, and forward that information to either me or Pulverizer Design. Since we have not received this information, I assume that you have not yet had a chance to inspect the mill.

I have attached a copy of the July 21, 1994 letter from Pulverizer Design (Don Dougan) responding to my letter with comments and recommendations.

Please review these two (2) letters and call me at (216)860-2889 if you have any questions.

With regards to the installation schedule for the third weldment rotating throat assembly at Orlando Utilities, the customer advised me today that they do not anticipate installing this throat assembly for another eight (8) weeks or so due to the current demand for electricity. As soon as the customer advises the new schedule, I will forward that information to you.

Sincerely,

J. C. Pugh/amp

J. C. Pugh
Special Product Development
(216)860-2889

/amp

cc: J. B. Doyle - Denver
F. J. McGinley - Denver

IP12_001592

Babcock & Wilcox
a McDermott company

SERVICE
our base business

To	DISTRIBUTION
From	J. C. PUGH - SPECIAL PRODUCT DEVELOPMENT - ESD - BT18 (2889)
Cust.	INTERMOUNTAIN POWER - DELTA
File No. or Ref.	RB-614, 615
Subj.	MPS-89G LOADING ROD FAILURE AND STATIONARY THROAT DRIBBLE PROBLEMS
Date	JUNE 14, 1994

This letter to cover one customer and one subject only.

DISTRIBUTION
D. R. DOUGAN - BVCBOF
N. S. MOEN - BVCBOF
R. R. PIEPHO - BVCBOF

Cecil James called me today to advise that they broke another loading rod on one of their MPS-89G mills. During our meeting at the plant on May 24, 1994, I was under the impression that they were experiencing failure of the stud that connects the loading eye to the 3" diameter seal rod. As it turns out, the failures have been occurring in the area where the upper portion of the 1½" diameter loading rod connects to the 3" diameter seal rod. This latest rod failure occurred right at the bottom side of the nut, which tightens against the bottom of the seal rod.

I was wondering if the loading rod bellows assemblies used on these mills were permitting more movement of the seal rods than had existed with the original packing seal arrangement. I didn't think to ask the customer if the rate of rod failure had increased since installing the bellows seal arrangement.

If we thought that excessive horizontal movement of the seal rods may be the cause of the problem, should we recommend that the customer align the spring frame with a properly centered pressure frame and shim between the spring frame and anti-torque bars on the housing to limit rotation of the spring frame? If we feel that reducing spring frame movement may reduce loading rod failures, what are the clearances that should exist between the pressure frame wear plates and between the spring frame and anti-torque bars?

The customer was wondering if it might be a good idea to install some type of bushing, in the area where the packing seal had existed, to limit movement of the seal rod.

In addition to the loading rod problem, the customer mentioned that they were experiencing dribble problems in a mill that had a worn-out throat with several ports blocked-off. They were trying to extend the life of the throat as long as possible.

IP12_001593

The customer was wondering if we recommended any particular pattern when completely blocking-off stationary ports.

The only thing I could remember was a letter Don Dougan sent to me where he mentioned that whenever you block a port you should always leave both adjoining ports open.

I told Cecil I wasn't sure if we recommended blocking the more highly worn ports, which probably experienced the lowest air flow and the greatest amount of spillage, or whether we recommended blocking the higher flowing ports to try to force more air through the lower flowing ports.

Cecil said he would try to identify how many ports were blocked, along with the location of the blocked ports with respect to the roll wheels and the air inlet, and forward this information to B&W via fax.

Any recommendations regarding the loading rod failure problem or the port blocking/dribble problems would be greatly appreciated by this customer.

If you have any questions, please call me on Ext. 2889.

Jeff
J. C. Pugh

JCP14/klk

cc: J. Doyle - Denver Sales
F. McGinley - Denver Sales
S. W. Yorks - BT35

From: DON R DOUGAN (DOUGAN DR)
To: OSPREY(PUGH JC)
Date: Thursday, July 21, 1994 9:34 am
Subject: IPP MPS-89G Loading rods & Throats

I don't have any information on how they blocked ports in the mill. I would recommend that they always leave both adjoining ports open to minimize possible coal build-up on the throat. I would also recommend that the port be blocked by filling it with refractory. In regard to selectively blocking off ports which are highly worn, I have never been able to show this impacts coal dribble more than blocking other ports. It will, of course, stop wear of those ports. The bottom line is that the throat velocity has to be increased to reduce dribble. This means reducing the throat flow area by some means such as blocking.

In regard to the loading rod failures, it is possible that if the anti-torque bars are severely worn and the spring frame is rotated significantly off center it could be creating bending loads on the rods causing the failures. Removal of the old packing gland would probably move the problem down to the 1- 1/2" rod. Installing a bushing with a 3-1/8" ID at the bottom of the old packing gland would likely help if they continue to allow the spring frame to rotate off center. One possible way of doing this is to split a section of pipe and position each piece 1/16" off the loading rod.

Maintaining the pressure frame wear plate clearances and the anti-torque barclearances is extremely important in regard to minimizing loading rod problems and mill vibration. The current recommendation regarding pressure frame wear plate adjustment is as follows:

a) First center the pressure frame on the gearbox.

b) Make sure the right hand edges of the clockwise pressure frame wear plates are aligned with the edge of the housing wear plates. The pressure frame wear plates should then be parallel to the housing wear plate faces.

c) Shim the housing wear plates to obtain tight clearance (0") on the clockwise plates and 1/16" clearance on the counter clockwise plates.

In regard to the anti-torque bar adjustment, it should be as follows:

a) Center the pressure frame on the gearbox.

b) Position the spring frame so it is parallel to the pressure frame. The springs should not be bent.

c) The anti-torque bars should then be positioned so they are tight against the counter clockwise side of the forks on the spring frame. Thus the spring frame can not be rotated clockwise as viewed from above. There should be 1/4" clearance between the other side of the anti-torque bars and the clockwise side of the forks on the spring frame.

Please advise if you need anything else.

Don Dougan

INTERMOUNTAIN POWER SERVICE CORPORATION

CONFIRMATION: (435) 864-4414 EXT. 6577

FACSIMILE: (435) 864-6670

FACSIMILE COVER SHEET

DATE: Feb 4

TO: COMPANY NAME: B&W Powergen

ATTENTION: Ken Hall

FACSIMILE #: 801-544-1504

FROM: Phil Hailes EXT:

DEPT:

PAGES TO FOLLOW:

COMMENTS: IPP mill information

DATE & TIME SENT: 2.3.04 ~~AM~~ 11:55

CONFIRMATION BY:

APPROVED BY:

850 WEST BRUSHWELLMAN ROAD, DELTA, UT 84624-9546

EXISTING OPERATING DATA
B&W ROLL WHEEL TYPE PULVERIZER

The following data (provided by the customer) is required by B&W to size the port area for the rotating throat:

1. Normal full load coal flow per pulverizer 50-55 TPH.
2. Normal full load air flow per pulverizer ≈ 3600 lb/min.
3. Pulverizer inlet/outlet air temperature at above normal full load coal and air flow 320-380°F, outlet control to 150 °F.
4. Mill differential pressure at normal full load coal flow 14"-19".
5. Mill inlet static pressure at normal full load coal flow (high side of mill differential pressure 43"-46".
6. Maximum coal flow at which pulverizer is operated 68 TPH.
7. Minimum coal flow at which pulverizer is operated 19.5 TPH.
8. Number of coal pipes in service per pulverizer 6 (21" ID).
9. Raw coal hardgrove grindability 40-47.
10. Raw coal total/surface moisture 5-10%, 5-6%.
11. Raw coal ash content 7-12%.
12. Rank of fuel Class 2 Group 4 (Utah Bit).
13. Is there a significant amount of pyrites, rock or tramp iron in the coal? yes.
14. Existing Fineness / Desired Fineness ≈ 70% thru 200 mesh @ 46 HGI, at least match.
15. What is the major goal of installing rotating throats ie; reduce mill pressure drop, reduce grinding zone erosion, improve fineness? life extension throat.

#1 goal - ability to achieve 95% feeder speed without choking the mill (ie high ΔP)

#2 - Reduced mill wear and fineness control.

JCP438.doc\klk

January 15, 2004

IP12_001598

Powerquip

fax - 801-544-1504

EXISTING OPERATING DATA
B&W ROLL WHEEL TYPE PULVERIZER

The following data (provided by the customer) is required by B&W to size the port area for the rotating throat:

1. Normal full load coal flow per pulverizer 50-55 TPH.
2. Normal full load air flow per pulverizer ≈ 3600 lb/min.
3. Pulverizer inlet/outlet air temperature at above normal full load coal and air flow 320-380°F, outlet control to 150 °F.
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12. Rank of fuel Class 2 Group 4 (Utah Bit).
13. Is there a significant amount of pyrites, rock or tramp iron in the coal? yes.
14. Existing Fineness / Desired Fineness ≈ 70% thru 200 mesh @ 46 HGI, at least match.
15. What is the major goal of installing rotating throats ie; reduce mill pressure drop, reduce grinding zone erosion, improve fineness? life extension throat.

#1 goal - ability to achieve 95% feeder speed without choking the mill (i.e. high ΔP)

#2 - Reduced mill wear and fineness control.

Powerquip fax # 801-
544-1504

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: S. Gale Chapman

FROM: Dennis K. Killian

DATE: December 17, 1996

SUBJECT: Recommendation to Purchase a B&W Rotating Throat for Unit 2H Mill Installation

We recommend purchasing one additional set of B&W Rotating Throats for installation in the Unit 2H Pulverizer. We believe the benefits offered by the rotating throat warrant further consideration. Please approve the installation of the B&W Clockwise Rotating Throat by signing the attached purchase requisition.

The B&W Clockwise Rotating Throats in the Unit 1H Pulverizer have been in operation for approximately five months. Extensive testing of the throat have produced the following results:

Advantages

- The rotating throats provide improved fineness of approximately 1.5% over stationary throats.
- Erosion surveys (ultrasonic) confirm that the rotating throats should last over twice as long as the current stationary throats.
- The rotating throats have proven to reject rock more effectively than stationary throats. This will reduce mill maintenance and boiler slag and increase combustion stability.
- Rotating throat's O&M and initial costs are about 40% lower than that of the fixed throat.

Disadvantages

There is an apparent increase in mill motor current (approx. 6 amps) and rotor temperature (17°C) compared to the stationary throat. The increased quantities, however, are questionable. B&W and the power industry have not seen such increases. Unit 1A, 1F, 1B and 1H Mills are running at the same motor current,

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: S. Gale Chapman

FROM: Dennis K. Killian

DATE: May 15, 1995

SUBJECT: Recommendation to Install New B&W Rotating Throats

FILE: 01.12.02, 43.5800

5/17 MR Req to Pur

We recommend purchase and installation of one set of new style B&W rotating throats in the Unit 1H Pulverizer. Installation and testing of rotating throats in the Unit 1H Pulverizer would provide the following benefits over fixed throats:

1. Reduced mill abrasion
1. Improved mill performance
2. Minimum changeout costs

Reduced Mill Abrasion

Mill abrasion has caused serious concerns in both fixed throat and rotating throat mills. Mills with fixed throats wear out the throat segments at unacceptably high rates. Mills with rotating throats have thus far caused unacceptable erosion on the mill housing and internal components.

In the new style rotating throats, B&W has substantially addressed the concerns raised in our previous testing, through the use of improved materials, throat geometry and attachment design. The new throats should provide a good wear characteristic throughout the mill.

Improved Mill Performance

Within our rotating throat testing we established the relationship between rotating throat design and mill fineness. As a result, B&W has returned to their original throat orientation (clockwise). This design should provide improved mill fineness performance.

Minimum Changeout Costs

The ledge cover configuration on fixed throats is particularly difficult to install. Reinstalling fixed throats in Pulverizer 1H, would cost approximately $66,000 in hardware alone. The cost of the new B&W throats is approximately the same as the normal cost of a set of replacement fixed throats, $37,000.

but the motor temperature of 1A, 1F and 1B Mills are much lower than that of 1H Mill. This fact indicates that the temperature rise on Unit 1H Mill is caused by the inefficient motor air cooling and/or false RTD reading rather than the rotating throat. We believe that the next test will provide insights and optimization for the rotating throat.

The Unit 2H Pulverizer is now due for the 30,000 hours overhaul. With the improperly sized SAS Rotating Throat and worn parts, the performance of Unit 2H Mill is now jeopardized, causing unacceptable fineness, mill dribble and high motor current. We have increased the hydraulic skid to 2400 psi to only temporarily relieve the problems. This mill requires an immediate rotating throat replacement and major overhaul.

The material cost for replacing the SAS Rotating Throat with the B&W Rotating Throat or with the B&W Stationary Throat are $44,000 or $71,170 respectively. With the proven performances regarding fineness, rejects, grinding zone erosion and mechanical reliability, replacing the SAS Rotating Throat with the B&W Rotating Throat is the most beneficial choice since B&W also agreed to credit the throat cost ($44,000) towards one fixed throat if we return to B&W the test throat assembly within a 12 month test window.

Replacing all stationary throats with the B&W Clockwise Rotating Throat (at the end of Unit 2H Mill testing period) would be considered if the performance, erosion and mechanical reliability of Unit 2H Mill are favorable and if the increases in Unit 1H Mill's motor current and temperature are resolved.

Please direct questions and comments to Phong Do at Extension 6475.

PTD:JHN:dh
Attachments

cc: Robert A. Davis
Joe D. Hamblin
Dale Hurd

From: "Bernstein, Gary" <gsbernstein@babcock.com>
To: <Alan-D@ipsc.com>
Date: 12/23/02 10:06AM
Subject: Pulverizer Upgrades (Capacity Increase) Budgetary Proposal B&W Proposal No. P-003894 -- Updates

Alan,

Pursuant to our meeting last week, and per your request, please find the following:

1. B&W can confirm that a capacity increase can be realized on each pulverizer if rotating throats and DSVS classifiers are installed. Installing the other components in my 12/17/02 proposal are *recommended but not required for the capacity increase.*

2. B&W can offer performance guarantees.

3. Budgetary pricing for the options as presented in the meeting are:

$200,000 DSVS Classifier
$42,500 Rotating Throat (IPSC design)

$90,000 First Time Engineering Costs

First Mill upgraded will be $332.5K, with each additional mill priced (budgetary) at $242,500.

4. Installation of the upgraded materials will be by IPSC. B&W can offer technical assistance as discussed. Replacement of the components can be accomodated through the large maintenance door. No upgrades or replacements will be necessary on the mill top housing.

5. B&W is investigating the long lead time items to enable shorter delivery time spans for the first mill. Please also confirm status of the capital monies and if IPSC will issue a specification for this upgrade.

Regards,

Gary Bernstein
----- Forwarded by Gary S Bernstein/BARB/PGG/MCD on 12/23/2002 09:57 AM -----

Gary S Bernstein
12/12/2002 02:54 PM

To: Alan-D@ipsc.com
cc: JIM-N@ipsc.com, Phil-H@ipsc.com, RALPH-N@ipsc.com
Subject: Pulverizer Upgrades (Capacity Increase) Budgetary Proposal B&W Proposal No. P-003894

Alan,

Per your request, attached please find our budgetary proposal for the capacity increase for your B&W pulverizers.

I look forward to our meeting on Tuesday, December 17th in Delta.

Regards,

Gary S. Bernstein, P.E.
District Sales Manager
The Babcock & Wilcox Company

<<P003894 Pulverizer Upgrade Proposal.doc>>

CC: <JIM-N@ipsc.com>, <Phil-H@ipsc.com>, <RALPH-N@ipsc.com>, "Johns, Bob" <bfjohns@babcock.com>, "Kleisley, Roger" <rjkleisley@babcock.com>

Babcock & Wilcox
a McDermott company

Gary S. Bernstein, P.E.
District Sales Manager

3535 South Platte River Drive
Unit G-3
Sheridan, CO 80110
(303) 761-3388
Fax: (303) 761-1219

December 12, 2002

Intermountain Power Service Corporation
850 W. Brush Wellman Road
Delta, Utah 84624-9546

Attention: Mr. Alan Dewsnup, Maintenance Planner (Mechanical)

Subject: Request for Proposal – B&W Roll Wheel Pulverizer Upgrade B&W-89G to B&W-89G+

Reference: B&W Proposal No. P-003894

Dear Alan:

Pursuant to our teleconference last week, B&W is pleased to provide our budgetary proposal, P-003894, to increase the milling capacity of the B&W-89 pulverizers. The technical basis of our **budgetary proposal** to Intermountain Power for pulverizer upgrades is the information included in the Engineering Study issued last December (ES-854, dated 12/18/01). This study summarized all the changes needed to the existing equipment to achieve a 5% capacity increase.

The pricing is based on the B&W 89G+ pulverizer upgrade, the DSVS Rotating Classifier, and the new yoke being purchased. Both the **89G+ and the DSVS upgrades** are needed to achieve the 5% capacity increase. Please refer to the attached table that further describes the equipment included in this budgetary pricing.

Budgetary Pricing Summary

One Mill	**$610,000**	**[Includes all one-time costs]**
Subsequent Mills	**$520,000**	**[Assumes separate P.O.'s for each mill]**
All sixteen (16) Mills	**$7,994,000**	**[One P.O. for all 16 mills with delivery in one year period]**

This budgetary pricing is based on the following:

- The budgetary pricing summary is for material delivered.
- We have not included Service Engineers in our price
- Integration of the controls is by others.

If IPSC is interested in proceeding with this work and a firm price is needed, please allow 2-3 weeks for B&W to complete. Also, please advise if an installation price is needed.

I look forward to our meeting on Tuesday, December 16, 2002 to further discuss our proposal.

Sincerely,
The Babcock & Wilcox Company

Gary S. Bernstein

Gary S. Bernstein, P.E.
District Sales Manager

GSB:015

enclosure

cc: P. Hailes, IPSC Engineering
J. H. Nelson, IPSC Engineering
R. Newberry, IPSC Purchasing
R. F. Johns – Service Projects
R. J. Kleisley – Service Projects
D. P. Menster – Service Parts
R. W. Wewer – Denver Service
W. A. Willman – Denver Construction

Item	Scope	Benefits	Lead Time
1	DSVS Rotating Classifier	• Improved fineness • Reduced mill differential • Coupled with the 89G+ upgrade will provide the 5% capacity increase	20 - 24 weeks
2	B&W 89G+ Upgrade • New roll wheel brackets • New tires and segments • New ring seat assembly • New cast steel rotating throat • New roll wheel loading system • New wear plates	• Coupled with DSVS Classifier, will provide the required 5% capacity increase • All the benefits of the Reverse Angle, Cast Rotating Throat (below) • All the benefits of the Grinding Element Upgrade (below) • All the benefits of the Roll Wheel Loading System Upgrade (below)	20 - 24 weeks
3	Yoke	• Replacement part previously quoted	20 – 24 weeks
4	Reverse Angle, Cast Rotating Throat	• Lower pressure drop • Longest wear life • Best for gearbox removal	20 – 24 weeks
5	Grinding Element Upgrade • Tires • Segments	• Longer wear life • Possible reduced sand accumulation • Lower power • Soother operation at low load	20 – 24 weeks
6	Roll Wheel Loading System Upgrade • Rods • Springs • Hydraulic unit • New rod seal system	• Reduced maintenance cost • Improved fineness at high load • Lower system resistance • Increased turndown	20 – 24 weeks

Notes:

(1) The lead time is for the first mill. Each subsequent mill can be delivered 1-2 weeks later.
(2) To achieve 5% capacity increase both the DSVS classifier and the 89G+ upgrade are needed.
(3) Typical outage span for the 89G+ and DSVS upgrade is 8 weeks. This span is based on single shift, 40 hour work weeks.

1.0 Background and Objectives

RPI was contracted to develop a rotating throat for B&W MPS 89G mill for Intermountain Power (IP), Delta Unit 1. The primary goal of developing RPI's rotating throat for IP is to allow the existing B&W MPS 89G mill to operate with 95% feeder speed with a limitation in PA duct pressure of 44 iwc. With this mill capacity, IP is capable of operating six (6) mills to meet MCR coal flow demand, instead of currently seven (7) mills in service. The specific objectives to improve the mill performance with the RPI rotating throat, which were listed in RPI proposal No 501103 Rev. 2 dated July 23, 2003, are as follows.

- 62 tph (95% feeder speed) mill throughput [(1)]
- Coal fineness of 73%± thru 200 mesh
- Pressure differential not greater than 21 iwc between primary air inlet and classifier inlet. *(does not include classifier dP)*
- Cap of 44 iwc duct pressure
- Power consumption less than or equal to 70 amps of main motor
- Minimize reject rate

(1) 62 tph is the throughput specification in the proposal. However, 64 tph (95% feeder speed) is the throughput that satisfies IP.

2.0 RPI Design Basis

Total B&W MPS mill system pressure resistance primarily consists of mill pressure differential, coal pipe and burner pressure differential. All pressure differentials are a function of primary air (PA) flow. Within the design range, the lower the PA flow, the less the pressure differential of a mill system will be. The mill pressure differential mainly comprises pressure losses from throat nozzle, coal fluidized bed above the nozzle and the classifier. At a given mill throughput, harder coal and/or finer than standard coal fineness will increase coal particle circulation rate within the mill and thus increase mill pressure differential.

In order to maximize the reduction in mill system resistance to meet the requirement for capping the PA duct pressure at 44 iwc, RPI designed and sized the rotating throat with two approaches. One is to minimize mill PA flow; another is to decrease throat nozzle velocity within limits to maintain proper fluidization characteristics. Minimizing PA flow will reduce overall mill system pressure resistance from the mill inlet to burners, while decreasing the throat nozzle velocity will reduce the dP across the throat. At a specified throat nozzle velocity, the nozzle flow section area has to become smaller as PA flow is reduced.

Based on BBPS throat sizing standard, the recommended maximum throat nozzle velocity range is 80 - 95 m/s, while the minimum required throat nozzle velocity is about 70 m/s at full mill load, to prevent coal from rejecting through the nozzle and into the pyrites chamber or mill windbox below. To enhance throat operation flexibility, the RPI throat for IP was designed with the capability to adjust the throat nozzle opening area, which enables the throat to operate at the velocity between 71 m/s to 80 m/s, based on preliminarily designed A/C ratio of 1.7 for full mill load.

In principle, the configuration of RPI's rotating throat employed standard BBPS rotating throat design criteria except for rotating ledge cover that has been successfully applied on the MPS 170 mill in Mitsui Project (RPI Contract 96201) and bell-shaped nozzle inlet which IP requested, as well as attachment mechanism to adapt B&W MPS 89G mill configuration and mounting dimensions. This prototype throat was made from carbon steel, and the nozzle in segments was cast rather than fabricated as normal practice due to the bell-shaped nozzle inlet requirement.

3.0 Findings

3.1 Delta Unit 1, 1E mill was retrofitted with RPI rotating throat in the mid of July 2003. On July 2, 2003, a pre retrofit mill test was performed for the existing mill and throat (stationary) worn condition. With 44.6 iwc PA duct pressure, the maximum achievable mill load during this pre retrofit testing was 54.4 tph (80% feeder speed). At 50.6 tph (74% feeder speed) mill load, the mill operated at 17.8 iwc pressure differential. The A/C ratio was 2.2 with 5.1% PA flow bias setup. The mill motor amps for 50.6 tph mill load were 72.5 amps.

3.2 The post retrofit mill test with RPI rotating throat installed was conducted on November 11, 2003. The throat nozzle was setup at maximum opening area for the testing. The highest steady mill load tested was 61.4 tph at 44.1 iwc PA duct pressure. No further increase for mill load was tested due to the PA flow choking at the capped PA pressure of 44 iwc. Ultra fine coal fineness shown in Table 1 was obtained at this mill load condition.

Table 1. Coal Fineness Data

Coal fineness	50 mesh	100 mesh	200 mesh
% passing through	100	98.0	79.1

The other operating parameters and mill loads tested are listed as follows in Table 2.

Table 2. Post Retrofit Testing Results

Feeder speed	90	88	85	80	75
Coal flow, t/hr	61.4	60.1	58.3	55.1	51.3
Primary air flow, (PA), Klb/hr	182.5	190	207	214	215
A/C ratio	1.49	1.58	1.78	1.94	2.10
Motor amps	76.4	73.2	71.7	71.4	70.5
Mill dP, iwc	27.3	26.8	25.8	24.3	21.3

3.3 The increase in mill dP is a key factor to prevent the mill from being tested at higher mill loads. At reduced mill loads, say at 50 tph, the mill with RPI rotating throat has higher mill dP than other mills for the current mill A/C ratio characteristic. This is no surprise since the RPI throat was designed purposely to reduce nozzle opening area for minimizing PA flow. With the current mill A/C characterization, the mill operates at PA flow higher than the RPI throat required, which results in higher throat nozzle velocity as designed and thus produces higher pressure differential across the throat. If the mill were re characterized to produce RPI's recommended design air to coal characteristic, mill dP would reduce.

3.4 On the other hand, coal fineness analysis indicated the lower PA flow operation allowed the mill to produce ultra fine coal product during the testing. Ultra fine coal fineness typically requires more mill power consumption, and increases coal particle circulation rate within the mill. This creates higher dP in the mill and classifier. A decrease in mill dP up to 2 to 3 iwc could be expected by adjusting the classifier directional vanes setup to detune the classifier and decrease coal fineness from 79.1 % < 200 mesh to IP's specified 73% < 200 mesh in the proposal. It is possible that resulting mill dP reduction will allow the mill to achieve the throughput of 64 tph at the given 44 iwc PA duct pressure.

3.5 Based on RPI MPS mill engineering standards for RPI's rotating throat, the mill pressure differential, at tested mill load of 61.4 tph and resultant ultra coal fineness, is approaching 30 to 32 iwc (including classifier dP). It is predicted that with standard RPI throat design, the mill dP at the mill load of 64 tph and coal fineness of 73% < 200 mesh will be 28 to 30 iwc (including classifier dP). This implies that with standard RPI rotating throat design, there is little margin for PA duct pressure when the mill operates at the load of 64 tph at the given 44 iwc PA duct pressure limit. Additionally, mill to burner pressure differential increased up to 2 iwc since the initial proposal was developed, because variable orifices were installed during an outage last summer. This makes the margin even tighter.

3.6 The current B&W MPS 89G mill rating capacity is 68 tph at standard fuel and coal fineness. The corrected mill capacity with unworn mill grinding elements will be approximately 63 tph when burning coal of 48.5 HGI and with 6.8% moisture content, and at the specified coal fineness of 73% < 200 mesh. When the mill operates at the capacity higher than this corrected capacity, a significant coal particle circulation within the mill will be generated due to insufficient mill grinding capacity to produce the required coal capacity with the qualified coal fineness passing through the classifier. The increase of coal particle internal circulation requires additional support from PA duct pressure. If the given 44 iwc PA duct pressure is insufficient to meet this requirement, the PA flow will be choked (coal internal circulation rate increases further) to reach a new equilibrium mill operating condition. The mill has to be shut down eventually as the mill load continues to increase, because of the incapability of PA to convey the coal and /or unacceptable coal reject rate through the throat. Obviously, the solution to deal with this situation is either to increase the mill grinding capability by retrofitting the mill or to decrease coal fineness by adjusting the current classifier setup. Another option is to increase mill classification efficiency through a dynamic classifier, rather than the rotating throat or increase in PA duct pressure. The mill capacity evaluation and testing results, to date, indicate the mill at 64 tph load with specified coal fineness of 73% < 200 mesh will be operating around this situation, while the mill load of 61.4 tph with the coal fineness of 79.1 % < 200 mesh during the mill testing is equivalent to 67 tph theoretically when converting the coal fineness of 79.1% < 200 mesh to that of specified 73% < 200 mesh. This is approximately 6.3% higher than corrected mill capacity of 63 tph.

4.0 Conclusions

4.1 RPI approached the rotating throat design with the intent of minimizing rotating throat and mill system dP by two steps 1) the design criteria for nozzle sizing was based on reducing the throat velocity, and 2) the rotating throat was designed to operate at a lower A/C ratio than all current throat designs. This lower PA flow (lower A/C ratio) requirement not only reduces mill system pressure resistance from the mill to burners but also positively affects erosive wear in the upper mill housing and burners / burner lines when firing the coal with a large amount of rock.

4.2 The mill testing demonstrated that the RPI rotating throat is capable of achieving the mill capacity of 61.4 tph with ultra coal fineness of 100% < 50 mesh, 98% < 100 mesh and 79.1 % < 200 mesh. This capacity is approximately 13% higher than measured during pre retrofit testing on this same mill. However, the achieved mill capacity does not meet the mill capacity of 64 tph at 95% feeder speed as IP desired due to the high mill dP and 44 iwc PA duct pressure limit. The mill dP can be reduced by decreasing the current ultra coal fineness to the specified objective coal fineness of 73% < 200 mesh, through adjustment of classifier directional vanes. It is possible that Mill 1E with the RPI rotating throat can achieve the capacity of 64 tph after the classifier directional vane adjustments are implemented and the mill is re characterized to reduce the current mill PA flow to the design PA flow rate for the RPI throat. The mill re characterization will also lower the mill dP at reduced mill loads.

4.3 RPI's analysis indicates that the mill will be running at its maximum capacity or higher when producing 64 tph coal with specified coal fineness of 73% < 200 mesh. At this throughput, the mill may exceed its capacity margin, and will potentially operate at an unstable condition, particularly when the mill grinding elements are in a worn condition and considering fluctuation in coal properties.

4.4 The RPI rotating throat with minimum required PA flow design allowed the mill to produce ultra fine coal fineness. This lower PA flow requirement will contribute to more PA system margin for IP since other mills at worn throat condition require bias PA setup for higher PA flow.

5.0 Recommendations

5.1 Further mill testing is required to conclude if the 1E mill equipped with the RPI rotating throat will produce the coal throughput of 64 tph as IP desired. The directional vanes in the mill classifier need to be adjusted to decrease coal fineness from the current obtained ultra coal fineness for the mill throughput increase. The throat inspection is recommended before performing the test.

5.2 Deviation from the RPI rotating throat design standard may be required to develop a rotating throat specific to IP requirements. Since the design margin is so tight at the given 44 iwc PA duct pressure, comprehensive mill testing of Mill 1E is required to collect detailed design information for this development effort. With the obtained design information, RPI can develop a rotating throat to meet IP's requirement, unless the testing proves the mill grinding capacity, rather than mill dP, is a dominant factor to prevent the mill from achieving the desired throughput at the specified coal fineness.

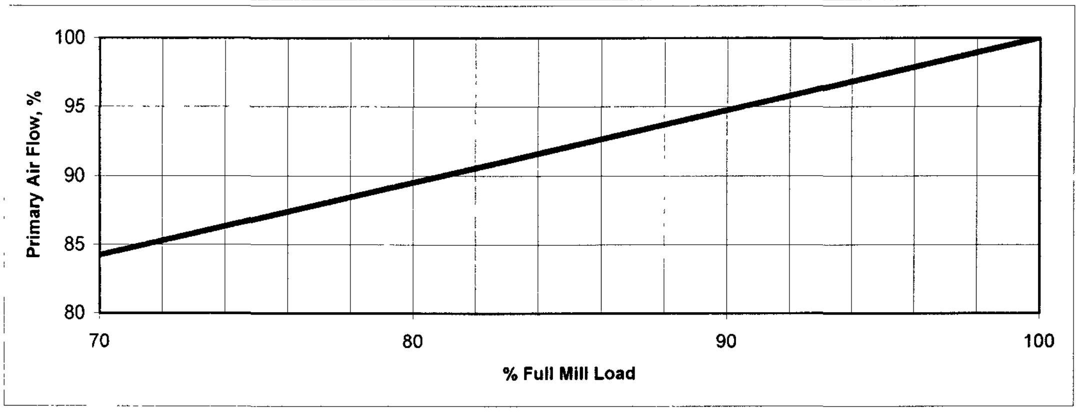
5.3 To benefit from a lower PA flow requirement with the RPI rotating throat design, re characterizing 1E mill is recommended to reduce the PA flow rate to the design PA flow range for the throat operation. Based on the mill testing results collected to date, preliminary mill characterization curves are attached. These curves need to be finalized and tuned with further mill testing and then incorporated into the mill control philosophy.

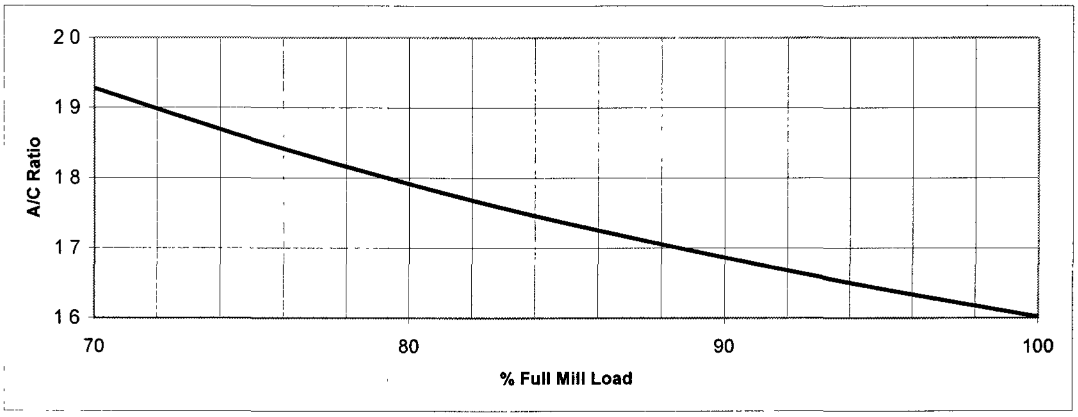
5.4 Considering the tight or potentially non existing margin on the mill grinding capacity, the rotating throat plus RPI's SLS dynamic classifier retrofit could be an ultimate solution for IP to have six mills in service for the MCR fuel demand. The dynamic classifier not only increases the mill capacity by improving the mill classification efficiency but also provides the mill real-time coal fineness control capability. This will allow mills to produce ultra fine level of coal fineness when seven (7) mills in service to significantly reduce LOI and meet coal demand with six (6) mills in service, as well as to improve coal distribution between coal pipes for better emission control.

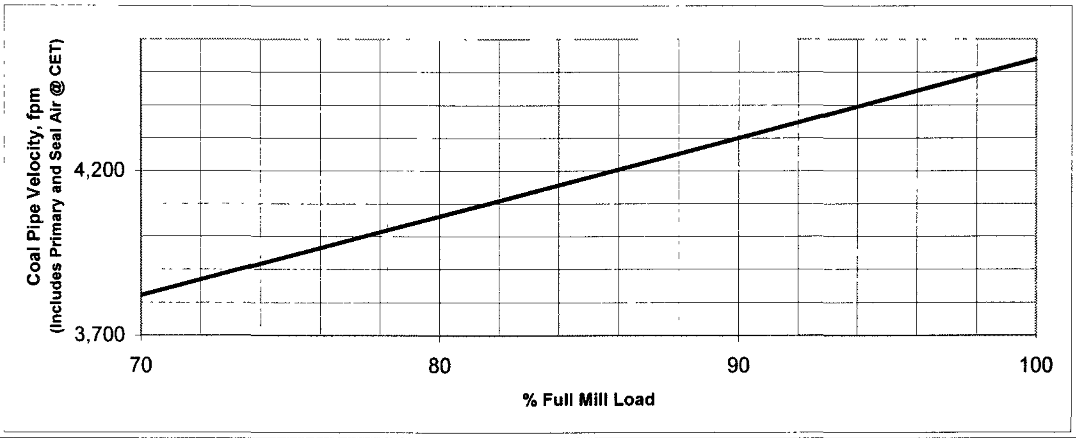
MPS Mill Rotating Throat Development
Project: 350052
Contract:201042

RILEYPower
A Babcock Power Inc Company

BABCOCK BORSIG POWER DB RILEY	**COAL PIPE SIZING AND A/C CHARACTERIZATION**		
Version 1, CPS&A-CC xls, June, 2000	Project Intermountain Power Location Delta, UT		Unit No #1
NOTES:	Issued By	Calculation Date	PROJECT NO
Revised after post installation testing	Q Lin	20-Dec-02	**350052**







% full mill load	70	75	80	85	90	95	100
Coal flow, lb/hr	89,600	96,000	102,400	108,800	115,200	121,600	128,000
% primary air flow	84 3	86 9	89 5	92 1	94 8	97 4	100 0
Primary air flow, (PA), lb/hr	172,713	178,094	183,475	188,856	194,238	199,619	205,000

From: <qlin@babcockpower.com>
To: "Phil Hailes" <Phil-H@ipsc.com>
Date: 10/15/2003 9:04:58 AM
Subject: Mill 1E post retrofit test @ IP

Phil, Attached is the mill testing outline for the proposed Mill 1E post rotating throat retrofit test. The attached file also includes the preliminary mill characterization curves that is the design basis for this rotating throat. As you can find, the A/C ratio at the target coal flow of 124,000 pph is about 1.74 (about 216,000 pph PA flow), which will reduce total mill system resistance by minimizing the PA flow and allow mill to maximize throughput based on available PA static pressure head.

As we discussed, let's tentatively schedule the mill testing date in the first week of November. Please confirm the date after you receive the testing outline.

Thanks, Q Lin

(See attached file: MPS Mill testing procedure - post installation v2@ IP.doc)

CC: <cpenterson@babcockpower.com>, <dcoates@babcockpower.com>, <GKing@babcockpower.com>

IPSC Uint #1, Mil 1E
MPS 89 mill post retrofit testing
201042

Post installation mill testing

for rotating throat at Intermountain Power Station

Test Objective

To obtain the data of mill performance with the new installed rotating throat. These data will be used to evaluate the performance of this rotating throat.

Test matrix and mill control setup

		Mill control	Sample requested	Sample analysis
1	Max. mill load (Run the mill load as high as mill system allows to)	• Feed rate manual • Grinding force loading to be max. • PA flow, mill exit temperature, roller loading seal air all to be set automatically	• One raw coal sample from coal feeder per test run. • Pulverized coal sampling for all coal pipes	• Raw coal samples: Prox., Ult., HGI • Pulverized coal samples: Moisture, fineness
2	Max. mill load by minimizing PA flow	• Feed rate manual • PA rating manual • Grinding force loading to be max. • Mill exit temperature, roller loading seal air all to be set automatically	Same as above	Same as above
3	80% mill load of Test #2	Same as above unless grinding force adjustment if needed	Same as above	Same as above
4	60% mill load of Test #3	Same as above unless grinding force adjustment if needed	Same as above	Same as above

Notes:

1. Mill needs to be stabilized at least one (1) hour before each test.
2. Data acquisition time should be scheduled to align with the sampling time period.
3. All samples should be split for separate analysis by BBPI Lab in Worcester
4. Primary airflow measurement (PA duct traverse) is required for each test. Dirty air testing may be used as a substitute if PA duct traverse is not available.

Data acquisition

The attached boiler and mill system data sheets should be completed every hour for each test run. Computer screen print-out may be used as supplements only to these data sheets.

IPSC Uint #1, Mil 1E
MPS 89 mill post retrofit testing
201042

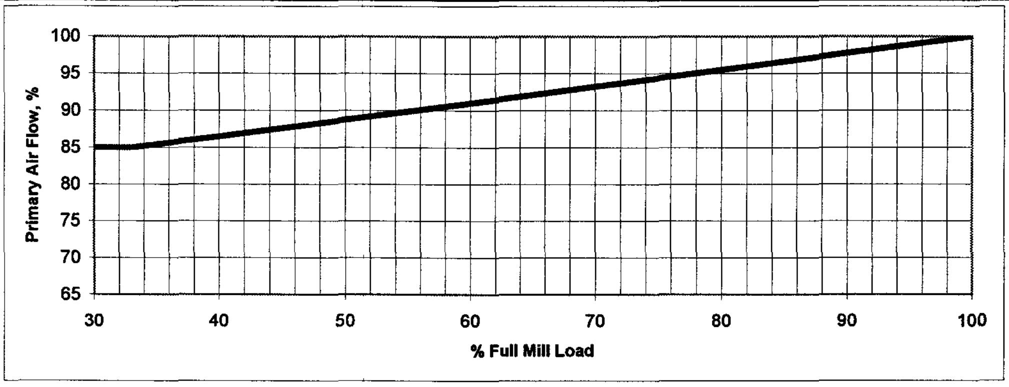
MPS mill test data sheet
For rotating throat at Intermountain Power Station

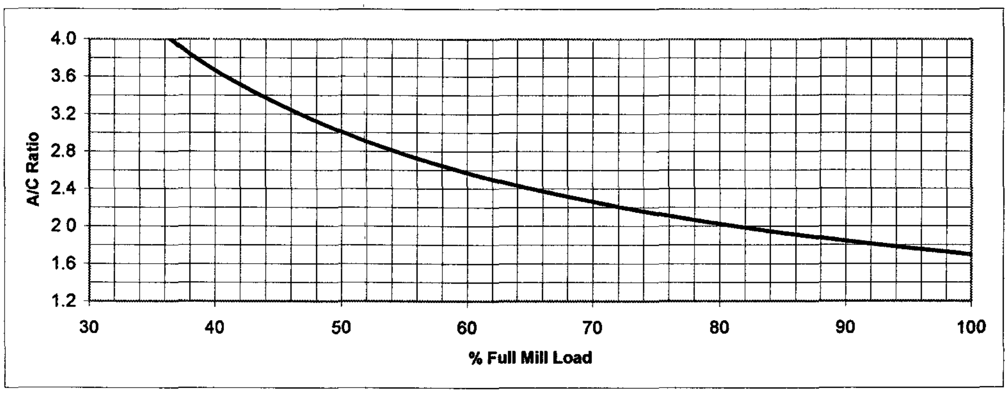
Date				
Time				
Unit				
Unit load, MW				
Boiler steam flow, kpph				
Turbine throttle press., psig				
Air heat outlet temp., °F				
FDfan disch. Press., "wc				
Windbox press., "wc				
Barometric press., "Hg				
Relative humidity, %				
Mill system control room data				
Mill no.				
Air flow, kpph				
Fuel flow, kpph				
Mill inlet temp., °F				
Mill outlet temp., °F				
Hot air damper, %LDG				
Tempering air damper, %LDG				
PA air damper, %LDG				
Seal air damper, %LDG				
Mill inlet press, "wc				
Mill outlet press., "wc				
Seal air header press., "wc				
Seal air differential, "wc				
Roller loading press., psig				
PA fan & mill bus voltage				
PA fan motor amps				
Mill motor amps				
Mill system local data				
Mill inlet temp., °F				
Mill outlet temp., °F				
Mill temp. below classifier, °F				
Hot air damper, %LDG				
Tempering air damper, %LDG				
PA air damper, %LDG				
Seal air damper, %LDG				
Mill inlet press, "wc				

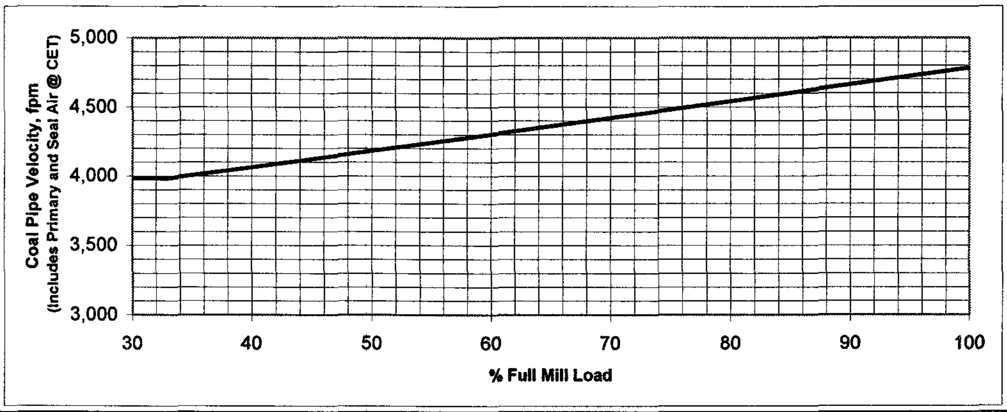
IPSC Uint #1, Mil 1E
MPS 89 mill post retrofit testing
201042

Mill outlet press, "wc				
Mill press. below classifier, "wc				

BABCOCK BORSIG POWER DB RILEY	**COAL PIPE SIZING AND A/C CHARACTERIZATION**		
	Project: Intermountain		
Version 1; CPS&A-CC xls, June, 2000	Location:		Unit No.: #1 or #2
NOTES:	Issued By	Calculation Date:	PROJECT NO.
Preliminay mill characterization for rotg throat design	Q Lin	10-Sep-02	350052







% full mill load	100	90	80	70	60	50	40	33
Coal flow, lb/hr	128,000	115,200	102,400	89,600	76,800	64,000	51,200	42,240
% pnmary air flow	100.0	97.8	95 5	93 3	91 0	88.8	86 5	**85.0**
Pnmary air flow, (PA), lb/hr	217,000	212,118	207,235	202,353	197,470	192,588	187,705	184,450

Dale Hurd Test

2H Mill Bikel Rotating Throats.
Friday, Nov 14

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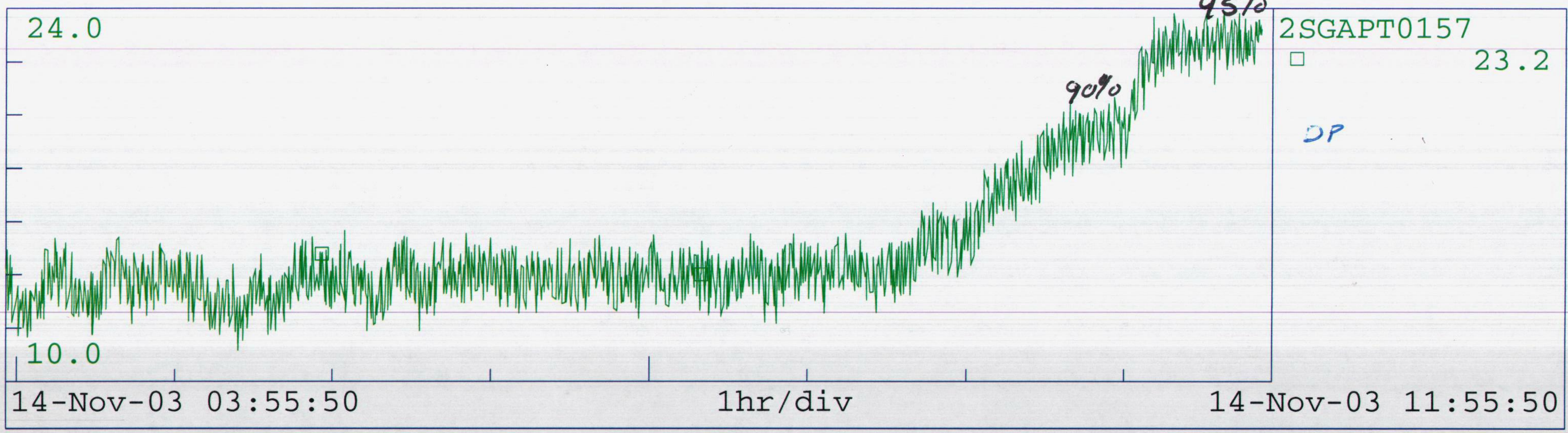

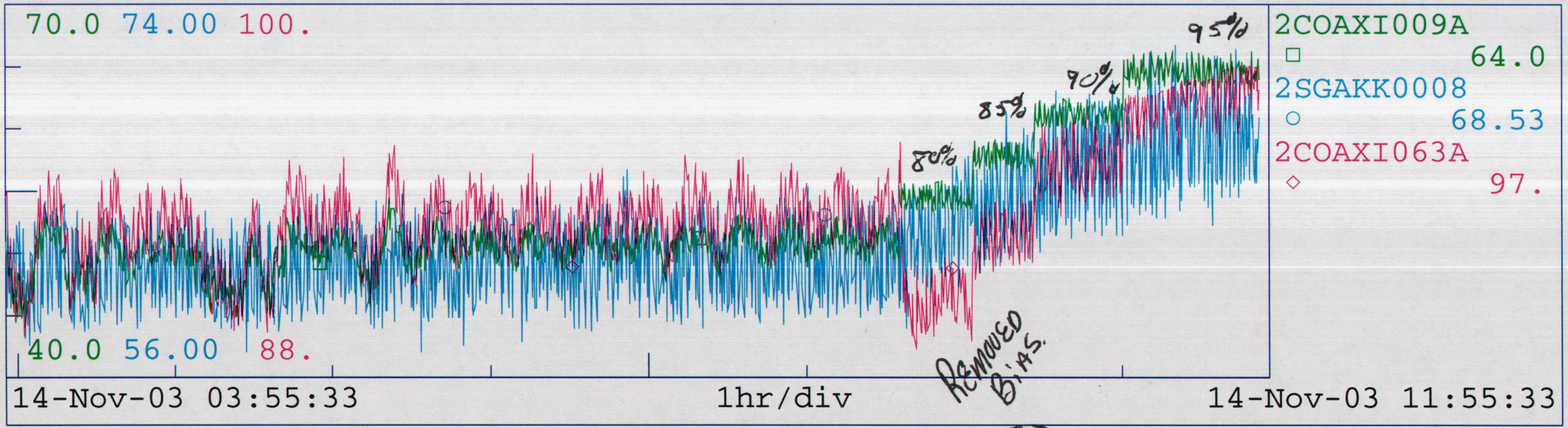

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98. PA
22.7. DP

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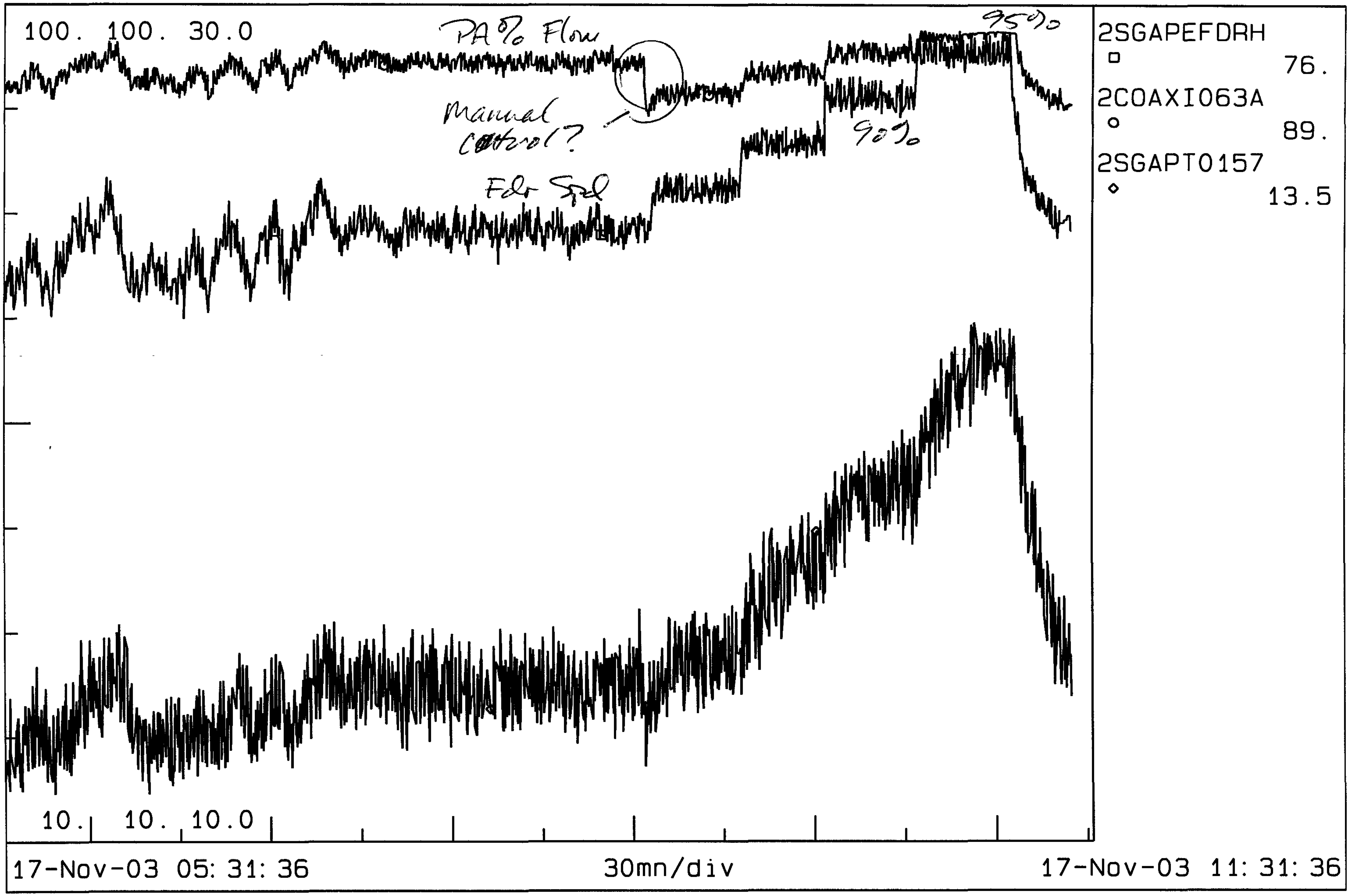

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IP12_001623

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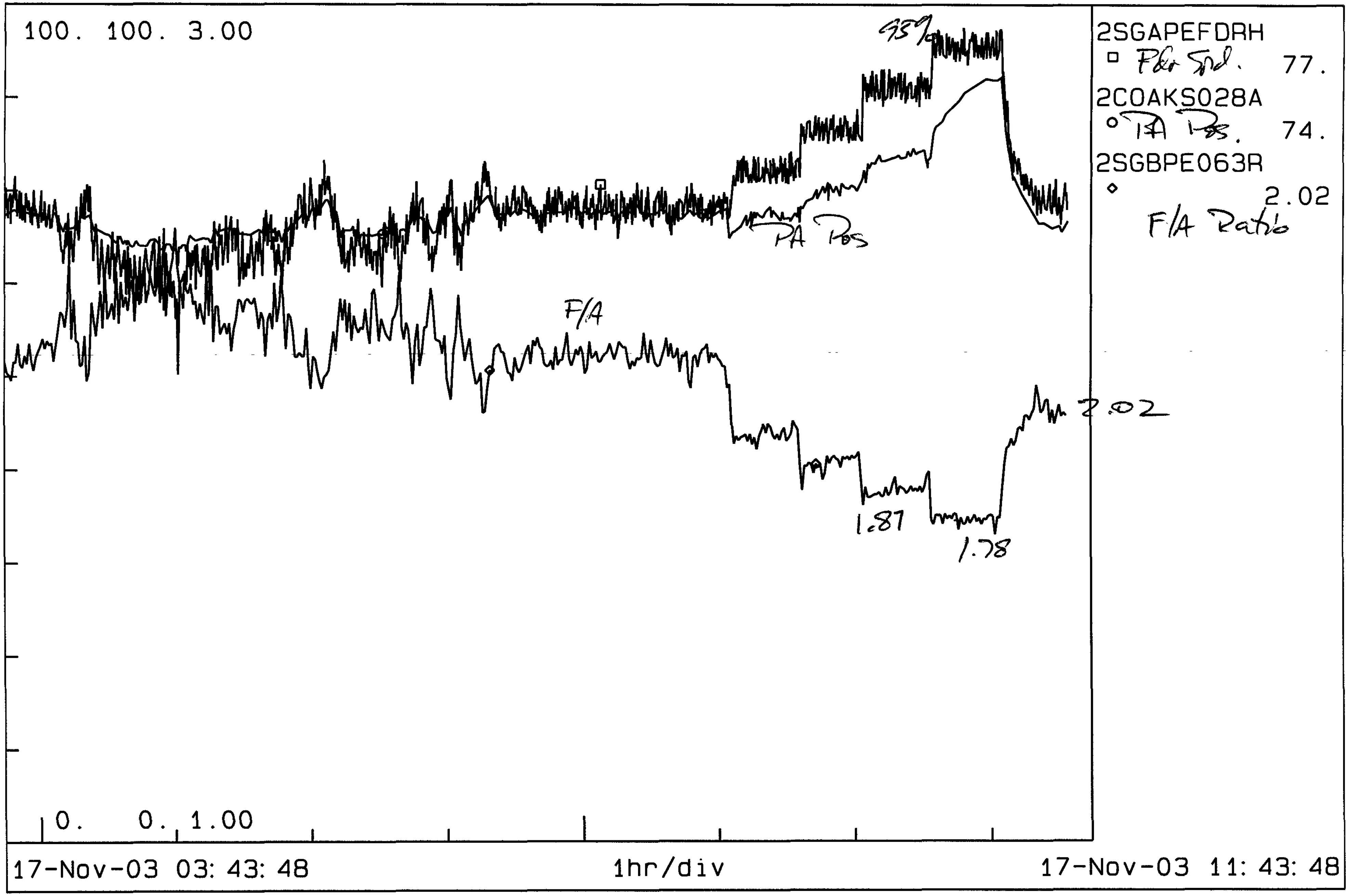

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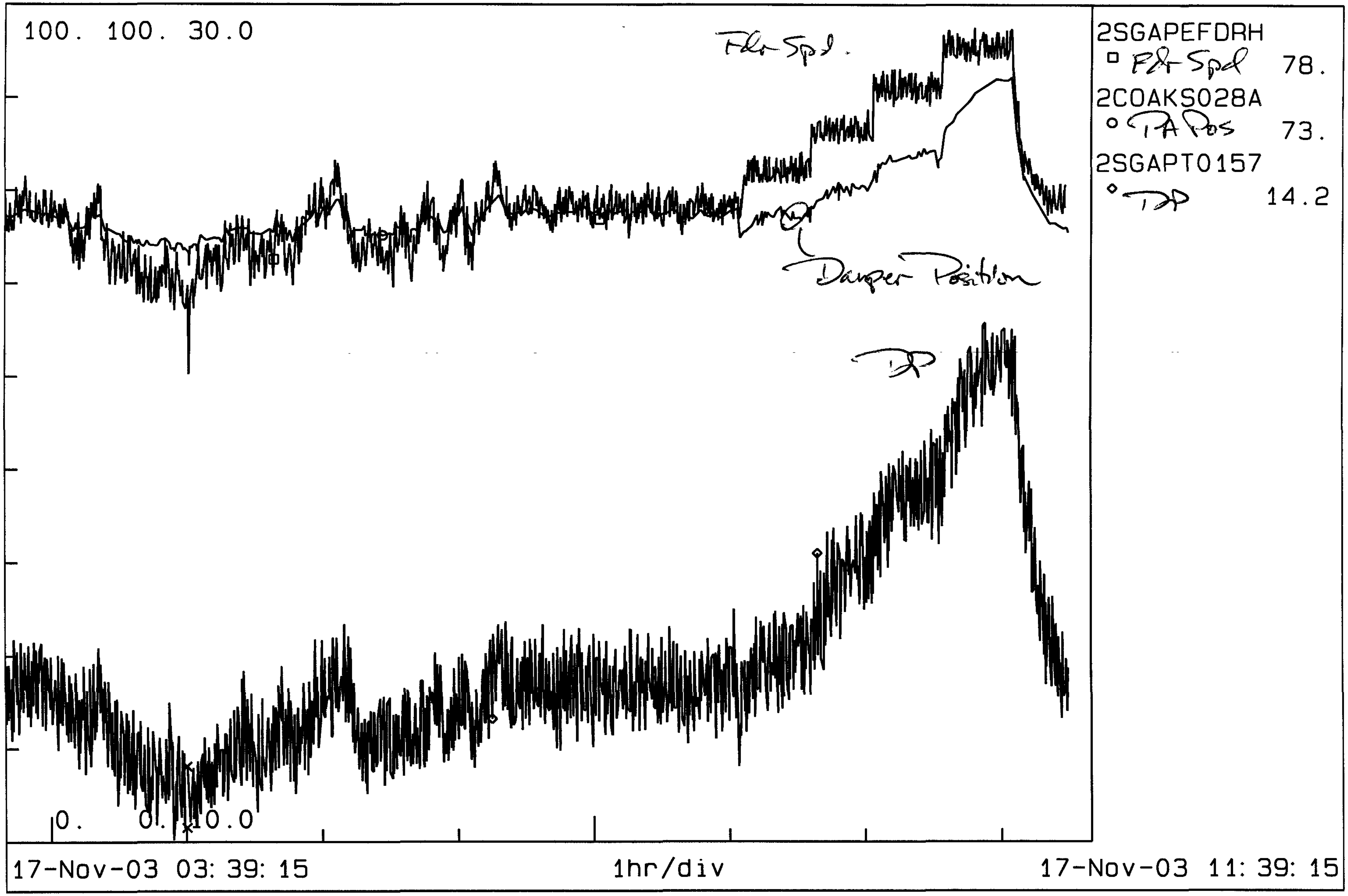

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Unit 2 899.8 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow358.4TPH	Bad	49.6	48.9	49.0	46.6	49.2	46.8	63.9
Feeder Speed	Calc	72.7	72.0	71.7	68.4	72.3	69.2	94.5
Amps (Duct Pr44.1)	0.0	59.0	65.5	67.1	60.7	63.4	63.4	67.0
Coal Pipe Vel	588.	4010.	3978.	3731.	4523.	3954.	4241.	4149.
PA Flow %	14.9	88.7	88.4	81.8	100.	88.2	94.1	97.1
PA Damper Pos (Duct Pr	0.9	67.6	70.5	69.3	77.1	69.6	81.4	91.0
Pulv Pitot DP	0.06	3.38	3.09	2.73	3.64	3.34	3.88	4.41
PA Mass Flow	595.	3548.	3539.	3355.	4045.	3523.	3773.	3653.
Pulv DP (NOx 0.37)	1.0	13.2	14.2	12.0	17.8	15.1	19.3	21.1
Air to Fuel Ratio	Calc	2.10	2.11	2.00	2.59	2.13	2.38	1.78
Pulv Inlet Temp	73.3	354.0	344.7	365.6	310.9	374.4	391.5	417.2
Pulv Outlet Temp	73.2	153.8	150.9	151.6	147.8	150.0	150.6	150.8
Coal Bias	0.0	0.0	0.0	0.0	-4.0	0.0	-4.0	0.0
Air Bias	8.1	0.0	0.0	0.0	13.6	0.0	6.8	0.0
Hyd Skid Pr Fdbk	1167.	1478.	1811.	2132.	1975.	2150.	2111.	2290.
Hyd Skid Pr Setpt	1149.	2221.	2181.	2188.	2108.	2194.	2118.	2397.

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95% Fdr Spd.

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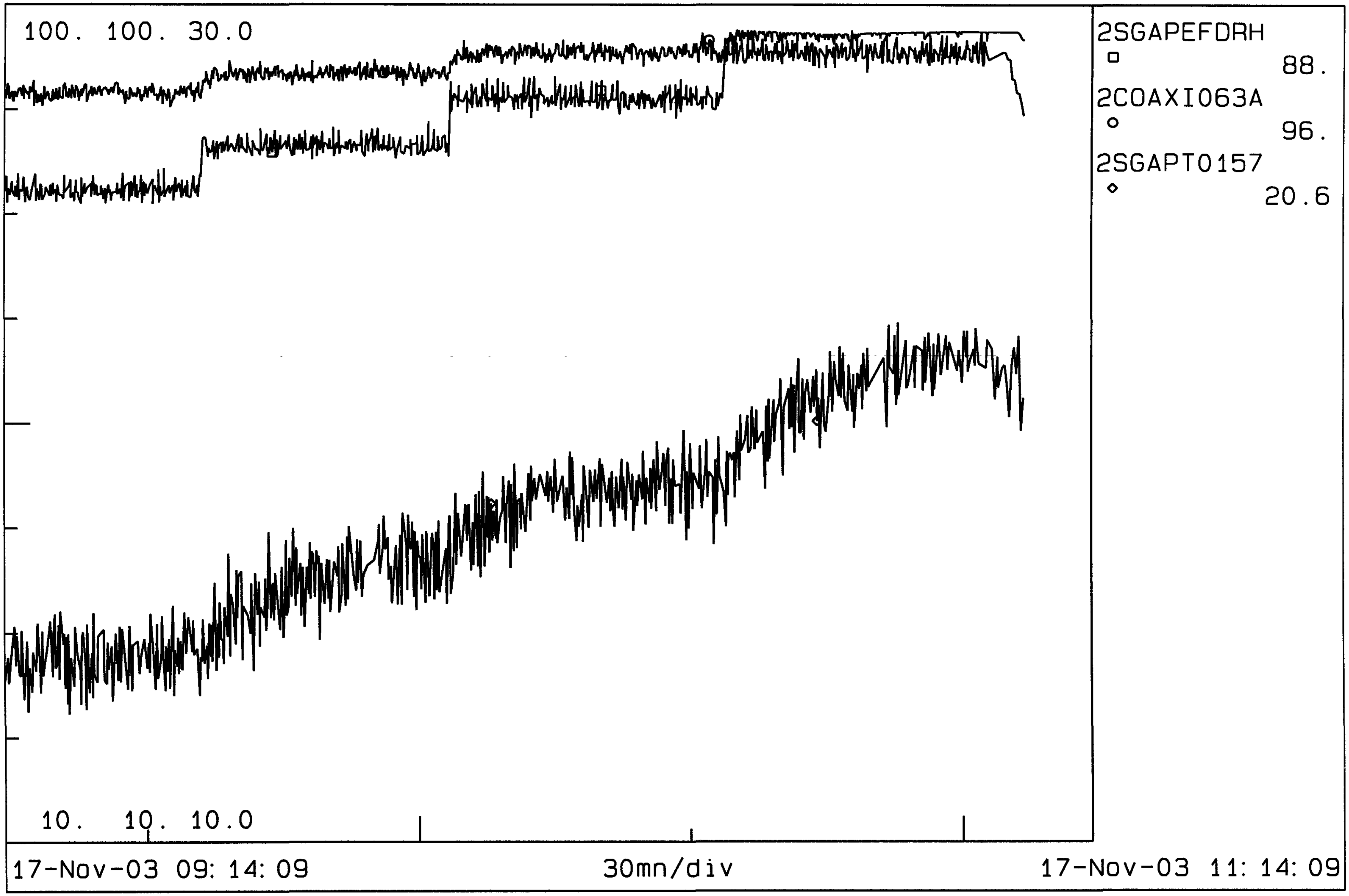

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90% Fdr Spd

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0 Messages U2 Pulv U2 Pulv Operating data Bowl Rotating 17-Nov-03 10: 19: 12

Unit 2 902.3 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow358.0TPH	0.1	49.8	49.3	51.0	47.5	50.4	47.3	61.2
Feeder Speed	0.2	72.9	72.0	73.8	70.0	73.2	69.5	89.6
Amps (Duct Pr44.0)	0.0	56.7	63.3	66.8	60.5	63.2	66.7	67.9
Coal Pipe Vel	588.	3981.	3951.	3772.	4488.	3937.	4195.	4244.
PA Flow %	14.8	88.6	88.5	83.5	100.	88.5	94.2	94.7
PA Damper Pos	0.9	67.9	70.6	69.4	78.4	70.2	83.4	81.7
Pulv Pitot DP	0.06	3.38	3.12	2.84	3.67	3.36	3.88	4.28
PA Mass Flow	594.	3523.	3515.	3280.	4013.	3504.	3746.	3779.
Pulv DP (NOx 0.38)	1.0	12.7	14.4	12.3	17.5	15.4	19.5	18.8
Air to Fuel Ratio	131.	2.12	2.13	2.04	2.51	2.09	2.35	1.87
Pulv Inlet Temp	73.4	352.5	346.6	359.6	313.6	373.7	387.8	414.5
Pulv Outlet Temp	72.6	153.8	151.4	151.1	148.9	150.4	150.4	150.1
Coal Bias	0.0	0.0	0.0	0.0	-4.0	0.0	-4.0	0.0
Air Bias	8.1	0.0	0.0	0.0	13.6	0.0	6.8	0.0
Hyd Skid Pr Fdbk	1168.	1495.	1831.	2133.	1976.	2171.	2117.	2267.
Hyd Skid Pr Setpt	1149.	2220.	2228.	2231.	2147.	2254.	2148.	2400.

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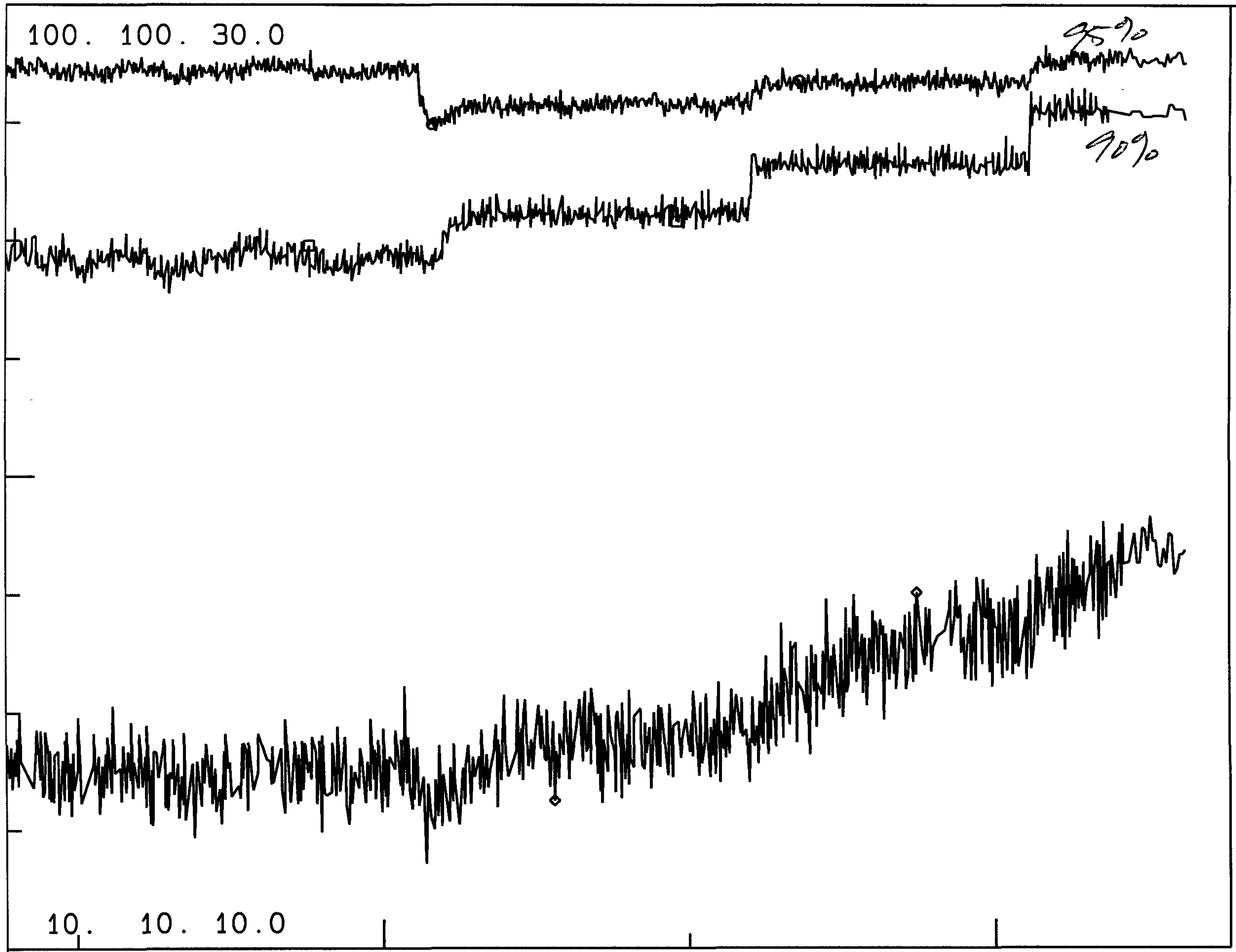

2SGAPEFDRH
▫ Fdr Spd. 89.
2COAXI063A
∘ % Air Flow 95.
2SGAPT0157
⋄ DP 18.4

17-Nov-03 08:22:51 30mn/div 17-Nov-03 10:22:51

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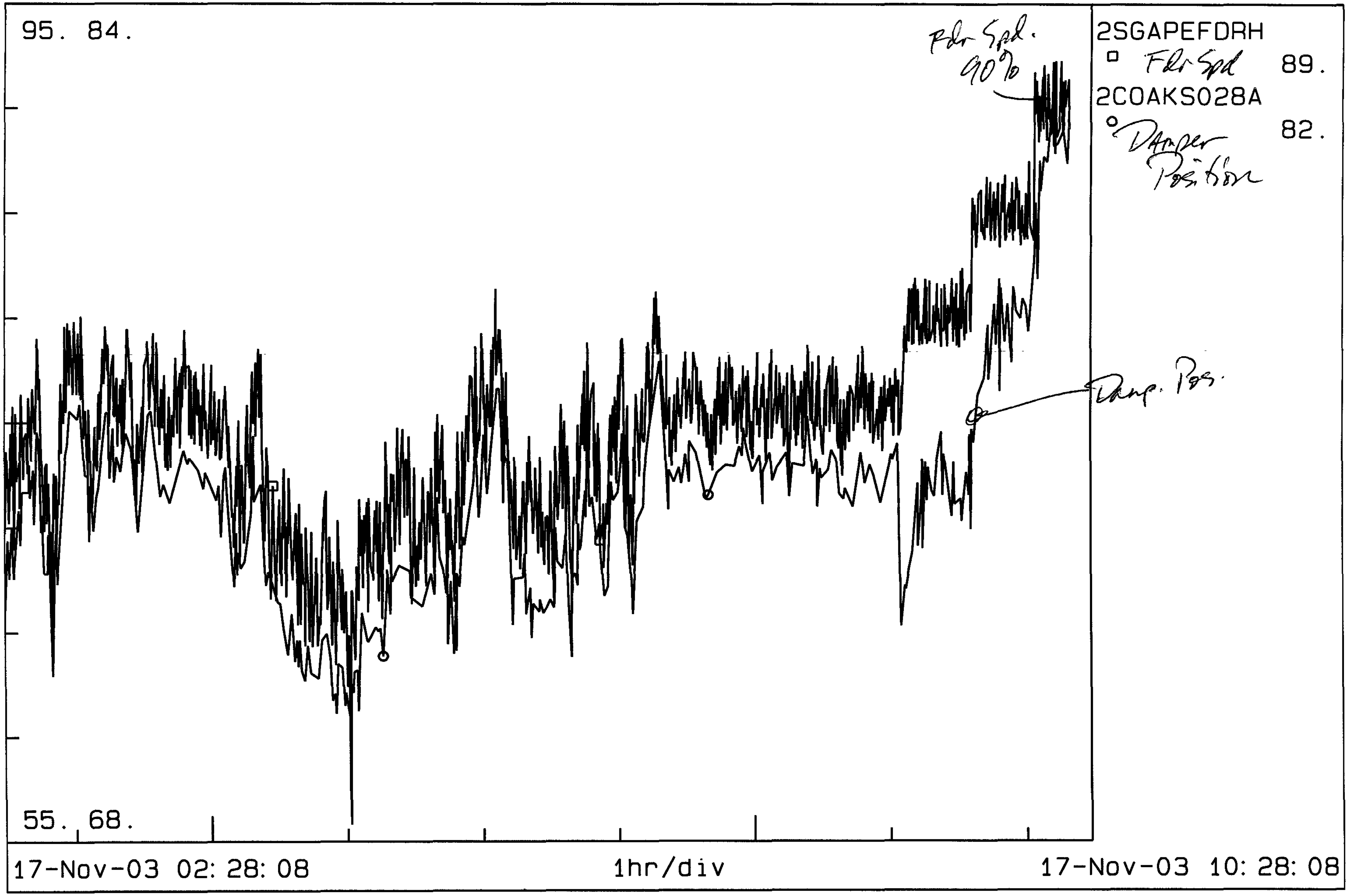

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IP12_001630

3PL Pet. King Throat Test

Unit 1	E Pulverizer	11/11/03 15:20	11/11/03 16:20
		Test 1	
1SGAPEFDRE	% Feeder Speed	90.35	
1COAXI006A	Actual Pulv Coal Flow (tph)	61.44	
1COAKS025A	PA Damper Position (%)	99.2	
1COAXI060A	PA Flow (%)	76.9	
1SGATE0643	PA Inlet Damper Temp (DEGF)	385.2	
1SGAPT0154	PA D/P (INWC)	27.313	
1COAXI068A	Disch Temp (DEGF)	151.370	
1SGAKK0005	Pulv Motor (amps)	76.397	
1SGBPE0060	PA Mass Flowrate (lb/min)	3100	
1SGBPE060R	air to fuel ratio	1.48	
1SGATZ009C	Pulv hrs since 30K Overhaul	2184	
1SGAPE1005	Pulv E amp swing	8.12	
1COAXI072A	PA Duct Pressure (INWC)	44.0	
1SGAPT0283	Hydraulic Skid Press FeedBack	2317	
1COAXI235A	Hydraulic Skid Press Set Pt	2400	
1inapt0227	Ambient Press	25.63	
1sgbpe060v	PA Velocity (ft/min)	3483.56	
1COAXI027A	Unit Load (mw)	949.93	
1coaxi023a	Steam Flow (FFW + Sprays)	6798.19 KPPH	
1COAXI012A	Main Steam Pressure	2402.13 PSIG	
1sgbte1065	Fan Room Temp	63.84 Deg F	
1SGBPT0256	Sec Air Duct Press East	4.05 in wc	
1SGBPT0257	Sec Air Duct Press West	4.47 in wc	
1SGAPT0176	E Windbox Press	2.53 in wc	
9wt-rh	Relative Humidity	53.88 %	

Unit 1	E Pulverizer	11/11/03 15:20	11/11/03 16:20
		Test 1	
1SGAPEFDRE	% Feeder Speed	90.35	
1COAXI006A	Actual Pulv Coal Flow (tph)	61.44	
1COAKS025A	PA Damper Position (%)	99.2	
1COAXI060A	PA Flow (%)	76.9	
1SGATE0643	PA Inlet Damper Temp (DEGF)	385.2	
1SGAPT0154	PA D/P (INWC)	27.313	
1COAXI068A	Disch Temp (DEGF)	151.370	
1SGAKK0005	Pulv Motor (amps)	76.397	
1SGBPE0060	PA Mass Flowrate (lb/min)	3100	
1SGBPE060R	air to fuel ratio	1.48	
1SGATZ009C	Pulv hrs since 30K Overhaul	2184	
1SGAPE1005	Pulv E amp swing	8.12	
1COAXI072A	PA Duct Pressure (INWC)	44.0	
1SGAPT0283	Hydraulic Skid Press FeedBack	2317	
1COAXI235A	Hydraulic Skid Press Set Pt	2400	
1inapt0227	Ambient Press	25.63	
1sgbpe060v	PA Velocity (ft/min)	3483.56	
1COAXI027A	Unit Load (mw)	949.93	
1coaxi023a	Steam Flow (FFW + Sprays)	6798.19 KPPH	
1COAXI012A	Main Steam Pressure	2402.13 PSIG	
1sgbte1065	Fan Room Temp	63.84 Deg F	
1SGBPT0256	Sec Air Duct Press East	4.05 in wc	
1SGBPT0257	Sec Air Duct Press West	4.47 in wc	
1SGAPT0176	E Windbox Press	2.53 in wc	
9wt-rh	Relative Humidity	53.88 %	

Printed out for: UNIT1OP - 13-Nov-03 14:40:37

95% Fdr Spd

0 Messages U1 Pulv U1 Pulv Operating data Stationary Throat. 13-Nov-03 14:40:37

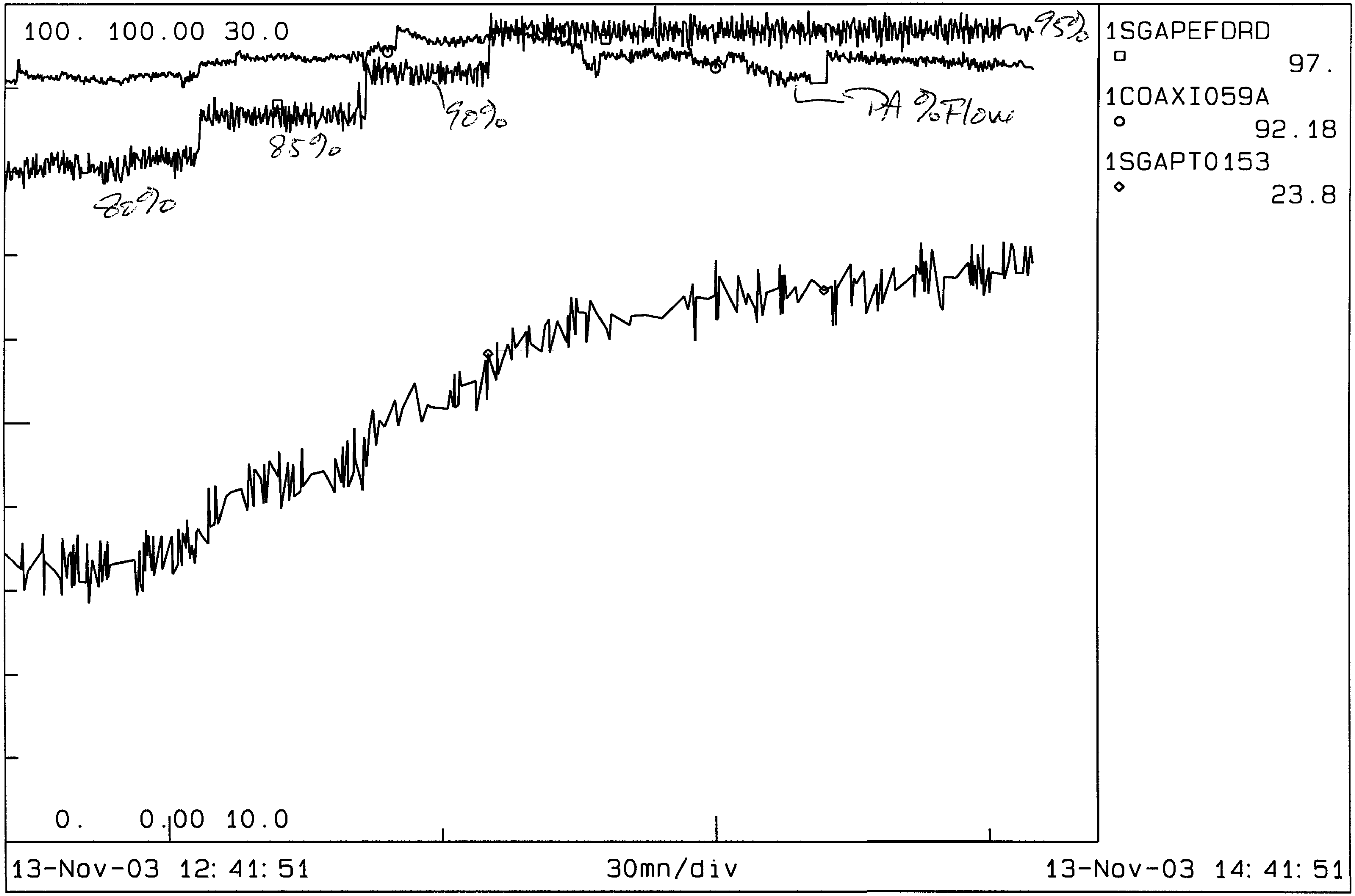
Unit 1 952.5MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow378.5TPH	47.6	54.2	52.8	66.5	52.5	0.2	52.3	53.9
Feeder Speed	71.6	79.3	78.1	96.8	76.7	0.2	77.2	80.1
Amps (Duct Pr44.1)	69.9	59.4	66.4	66.7	69.5	0.0	60.9	60.2
Coal Pipe Vel	4020.	4022.	3969.	4129.	3981.	0.	4248.	4174.
PA Flow %	90.3	90.3	89.7	92.6	89.9	0.0	95.1	94.4
PA Damper Pos	74.3	82.6	73.6	100.	86.4	0.6	76.0	92.8
SA Damper Pos	66.6	74.6	76.2	93.3	74.7	10.0	74.3	75.3
PA Mass Flow	3583.	3581.	3560.	3674.	3548.	0.	3791.	3730.
Pulv DP (NOx 0.38)	12.5	15.3	12.7	23.9	18.7	0.0	9.7	17.9
Air to Fuel Ratio	2.23	2.02	1.99	1.65	2.03	0.00	2.17	2.06
Pulv Inlet Temp	312.5	326.9	323.8	335.9	319.9	83.6	313.7	342.5
Pulv Outlet Temp	150.0	151.5	150.8	151.9	150.6	87.8	151.3	149.2
Coal Bias	-6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2332.	2291.	2295.	2265.	2321.	851.	2246.	2289.
Hyd Skid Pr Setpt	2148.	2393.	2341.	2400.	2318.	1149.	2322.	2384.

EndTim= 13-Nov-03 14:40:37 /EvalTim= 13-Nov-03 14:40:37 /PanRate= 0

95% Fdr Spd

Printed out for: UNIT1OP - 13-Nov-03 14:40:27

0 Messages U1 Pulv U1 Pulv Operating data 13-Nov-03 14:40:27



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95% Fdr Spd

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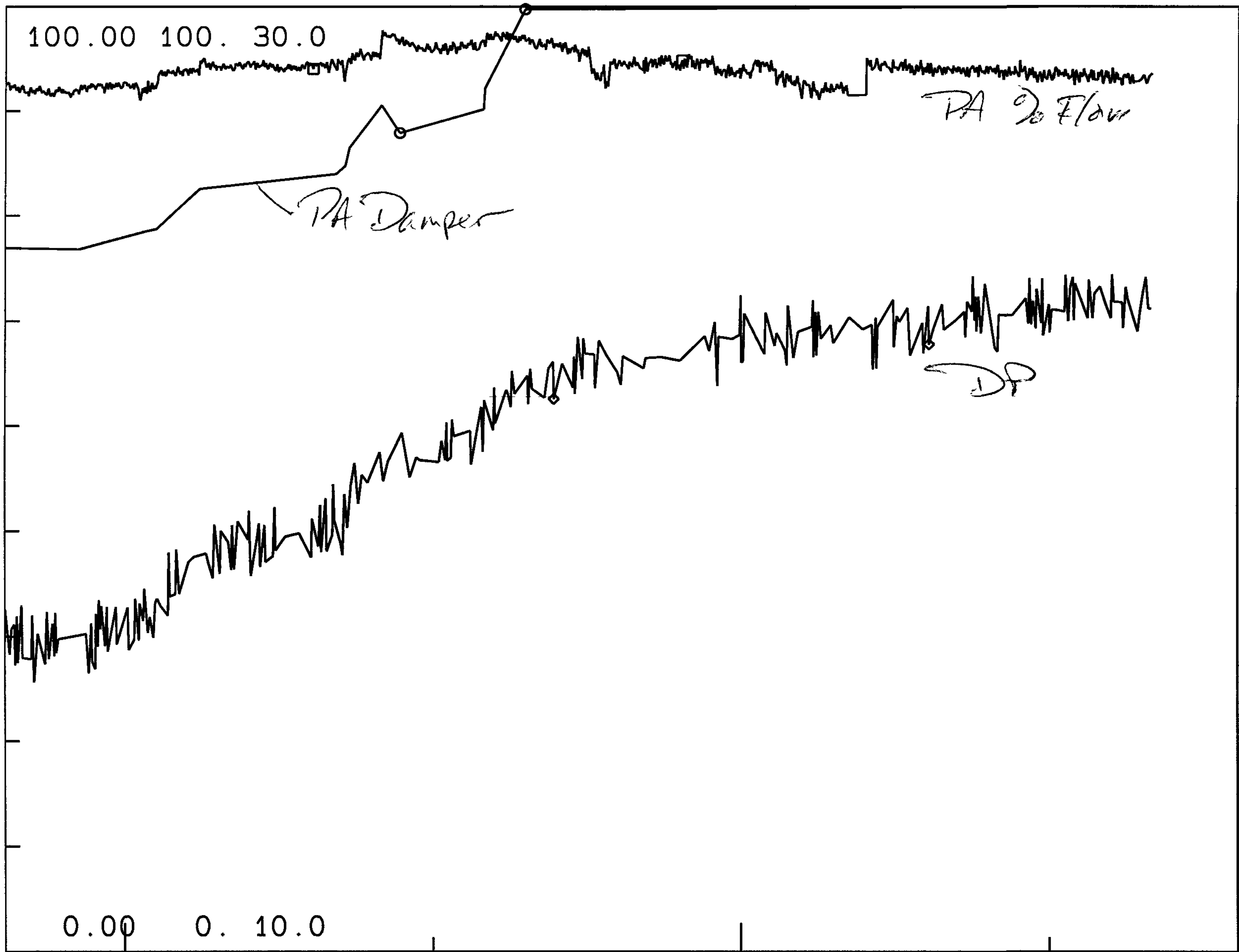

1COAXI059A □ 92.85

1COAKS024A ○ Damper 100.

1SGAPT0153 ◇ 23.6

13-Nov-03 12:48:18 30mn/div 13-Nov-03 14:48:18

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IP12_001635

Printed out for: UNIT1OP - 13-Nov-03 13:33:50 9090 Fdr Spd

0 Messages U1 Pulv U1 Pulv Operating data 13-Nov-03 13:33:50

Unit 1 953.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow379.8TPH	47.9	54.4	51.8	62.2	52.1	0.1	51.2	54.0
Feeder Speed	71.0	79.3	77.8	90.6	75.9	0.2	76.7	80.1
Amps (Duct Pr44.2)	72.2	58.7	66.4	60.7	65.7	0.0	55.5	60.5
Coal Pipe Vel	3974.	4016.	3998.	4305.	4005.	0.	4278.	4208.
PA Flow %	89.9	90.6	89.8	95.9	90.0	0.0	95.8	94.6
PA Damper Pos	75.0	83.3	73.9	89.1	87.1	1.3	76.6	94.7
SA Damper Pos	65.6	73.7	75.1	88.5	73.9	10.0	73.6	74.3
PA Mass Flow	3568.	3577.	3576.	3791.	3568.	0.	3798.	3762.
Pulv DP (NOx 0.38)	12.6	16.1	13.0	20.5	19.4	0.0	10.5	18.9
Air to Fuel Ratio	2.24	1.99	2.04	1.82	2.03	0.00	2.17	2.09
Pulv Inlet Temp	317.5	324.7	327.2	334.8	334.8	84.2	313.9	340.6
Pulv Outlet Temp	149.4	151.1	150.6	151.9	150.6	87.8	150.6	150.1
Coal Bias	-6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2338.	2291.	2295.	2265.	2325.	3.	2198.	2289.
Hyd Skid Pr Setpt	2161.	2400.	2305.	2400.	2304.	1149.	2281.	2386.

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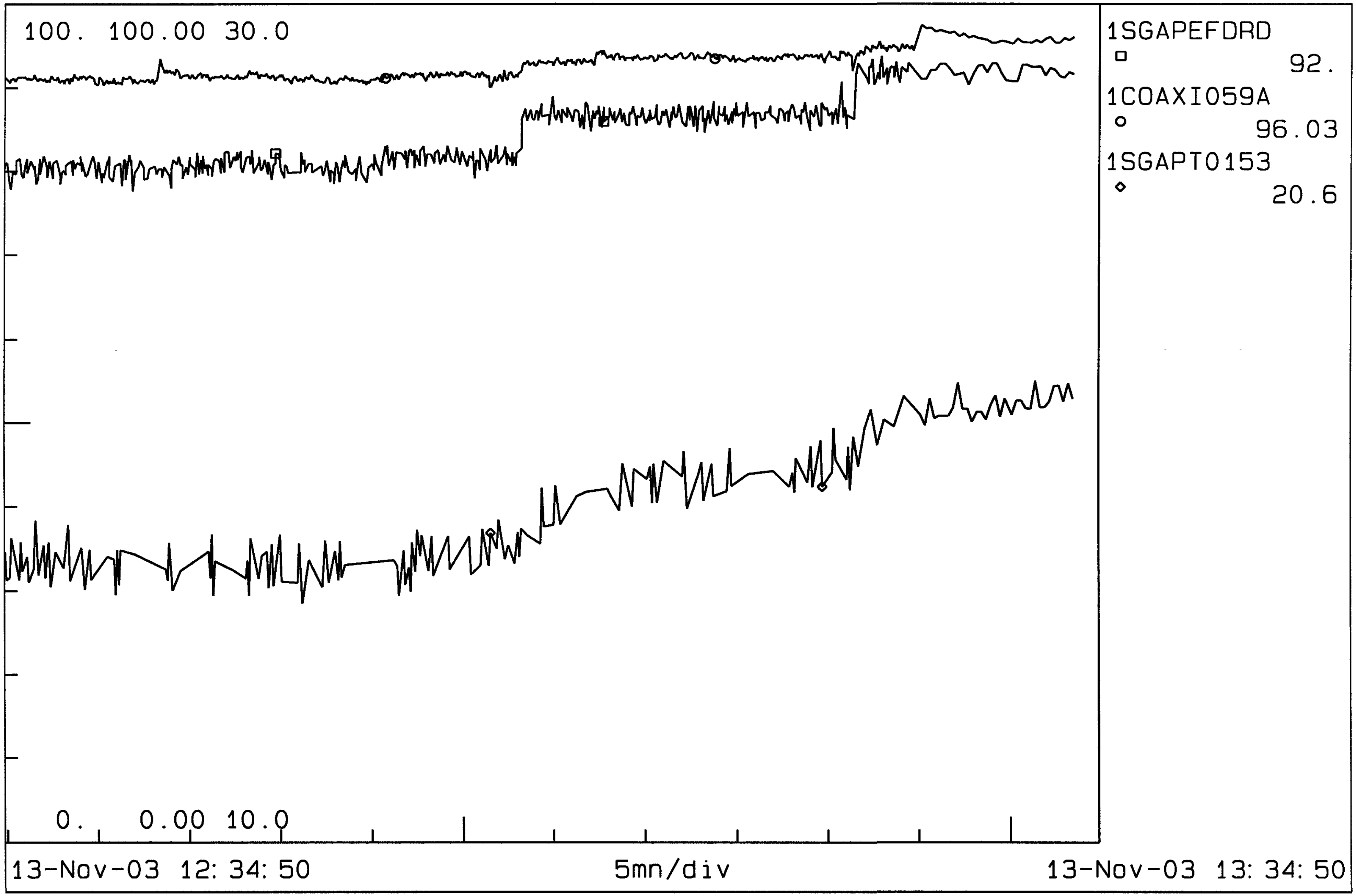
IP12_001636

Printed out for: UNIT1OP - 13-Nov-03 13: 33: 42 90% Fdr Spd

0 Messages U1 Pulv U1 Pulv Operating data 13-Nov-03 13: 33: 42



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Printed out for: UNIT1OP - 13-Nov-03 13:20:45 85% Fdr Spd

0 Messages U1 Pulv U1 Pulv Operating data 13-Nov-03 13:20:45

Unit 1 953.8 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow375.0TPH	49.3	55.3	53.3	59.6	53.3	0.2	52.4	54.9
Feeder Speed	71.3	79.5	78.9	87.0	78.3	0.2	78.0	80.5
Amps (Duct Pr44.0)	71.5	58.2	66.9	62.9	67.4	0.0	50.5	60.2
Coal Pipe Vel	3961.	4035.	4006.	4165.	4013.	0.	4249.	4200.
PA Flow %	89.7	91.0	90.1	93.7	89.9	0.0	96.0	94.7
PA Damper Pos	75.1	83.2	73.9	82.1	87.1	1.3	78.0	94.4
SA Damper Pos	67.8	76.0	77.4	83.8	75.8	10.0	75.6	76.7
PA Mass Flow	3547.	3594.	3566.	3716.	3567.	0.	3823.	3747.
Pulv DP (NOx 0.39)	13.0	15.5	12.8	19.1	19.0	0.0	10.7	18.0
Air to Fuel Ratio	2.21	1.98	2.01	1.90	2.03	0.00	2.16	2.06
Pulv Inlet Temp	320.0	327.6	323.2	326.3	335.6	83.9	310.8	345.3
Pulv Outlet Temp	150.0	151.5	150.6	151.9	151.9	87.8	150.9	150.9
Coal Bias	-6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2338.	2291.	2296.	2273.	2326.	3.	2185.	2288.
Hyd Skid Pr Setpt	2212.	2400.	2361.	2400.	2345.	1149.	2327.	2400.

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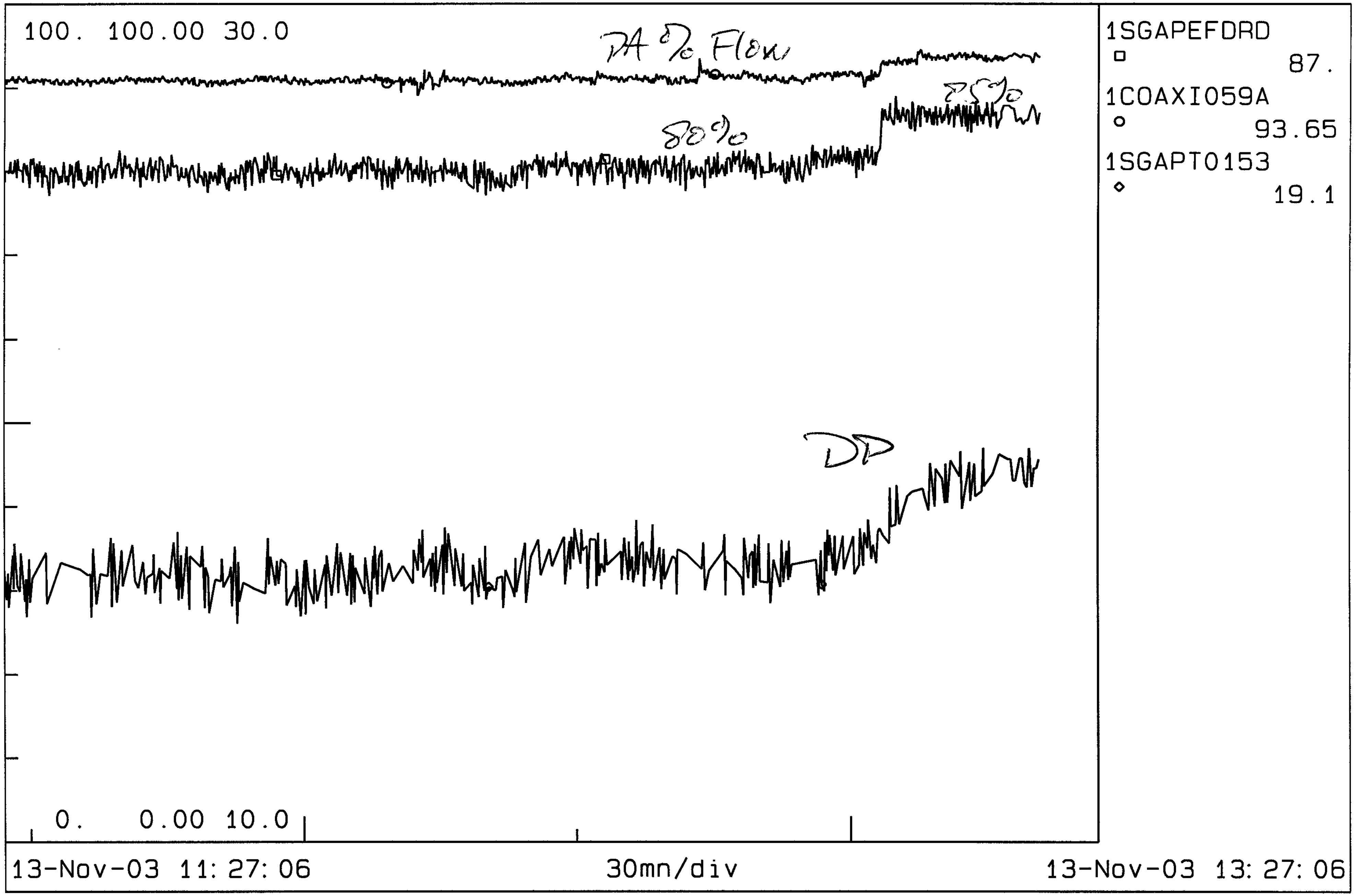
IP12_001638

Printed out for: UNIT1OP - 13-Nov-03 13:21:02

85% Fdr spd

0 Messages U1 Pulv U1 Pulv Operating data 13-Nov-03 13:21:02



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IP12_001639

80% FG Spd

Printed out for: UNIT1OP - 13-Nov-03 12:58:18

0 Messages U1 Pulv U1 Pulv Operating data 1D Stationary Throat 13-Nov-03 12:58:18

Unit 1 952.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow375.4TPH	48.0	54.4	54.0	55.0	52.7	0.2	52.6	55.1
Feeder Speed	71.1	80.0	79.1	80.9	77.6	0.2	77.4	80.0
Amps (Duct Pr44.1)	71.0	56.4	65.7	60.2	65.2	0.0	49.9	60.4
Coal Pipe Vel	3957.	4071.	4031.	4049.	4025.	0.	4222.	4231.
PA Flow %	89.5	91.2	90.6	91.4	90.3	0.0	95.2	95.1
PA Damper Pos	75.4	83.5	74.4	74.6	88.5	1.3	78.9	95.5
SA Damper Pos	68.0	75.9	77.6	79.1	76.3	10.0	75.8	76.8
PA Mass Flow	3519.	3606.	3595.	3620.	3589.	0.	3766.	3767.
Pulv DP (NOx 0.39	12.8	16.2	13.8	16.5	19.3	0.0	11.2	19.2
Air to Fuel Ratio	2.19	1.99	2.01	1.95	2.03	0.00	2.13	2.06
Pulv Inlet Temp	323.5	329.4	325.0	315.9	342.9	83.7	310.9	344.4
Pulv Outlet Temp	150.3	151.5	150.8	152.3	151.9	87.8	150.6	150.0
Coal Bias	-6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2340.	2289.	2295.	2273.	2329.	2.	2242.	2289.
Hyd Skid Pr Setpt	2164.	2400.	2386.	2400.	2328.	1149.	2334.	2400.

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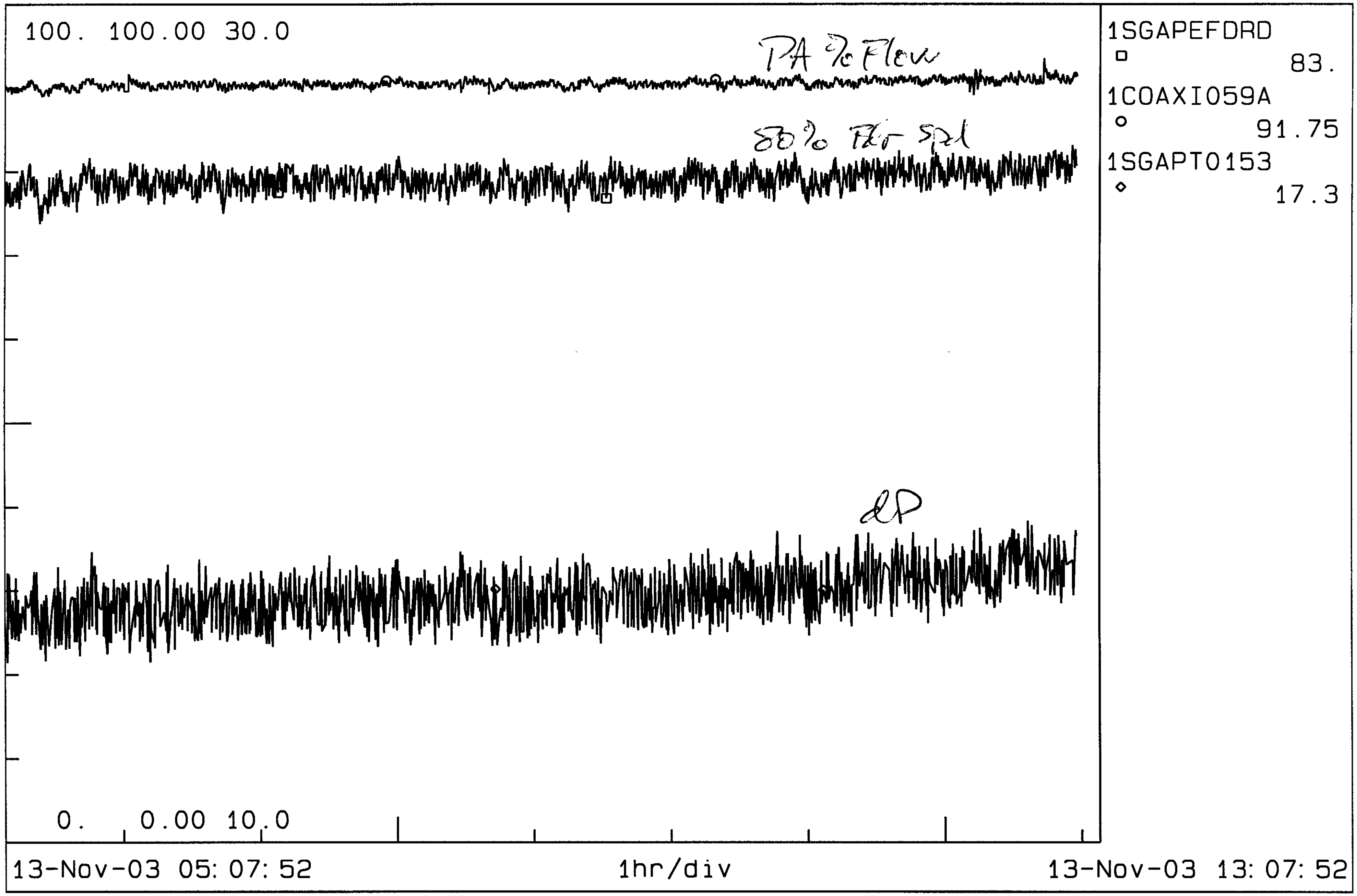
IP12_001640

Printed out for: UNIT1OP - 13-Nov-03 12:58:46

0 Messages U1 Pulv U1 Pulv Operating data

80% Fdr Spd

13-Nov-03 12:58:46



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IP12_001641

Printed out for: PHIL-H - 12-Aug-03 07:09:47 BPE Rotating Throat.

0 Messages U1 Pulv U1 Pulv Operating data 12-Aug-03 07:09:47

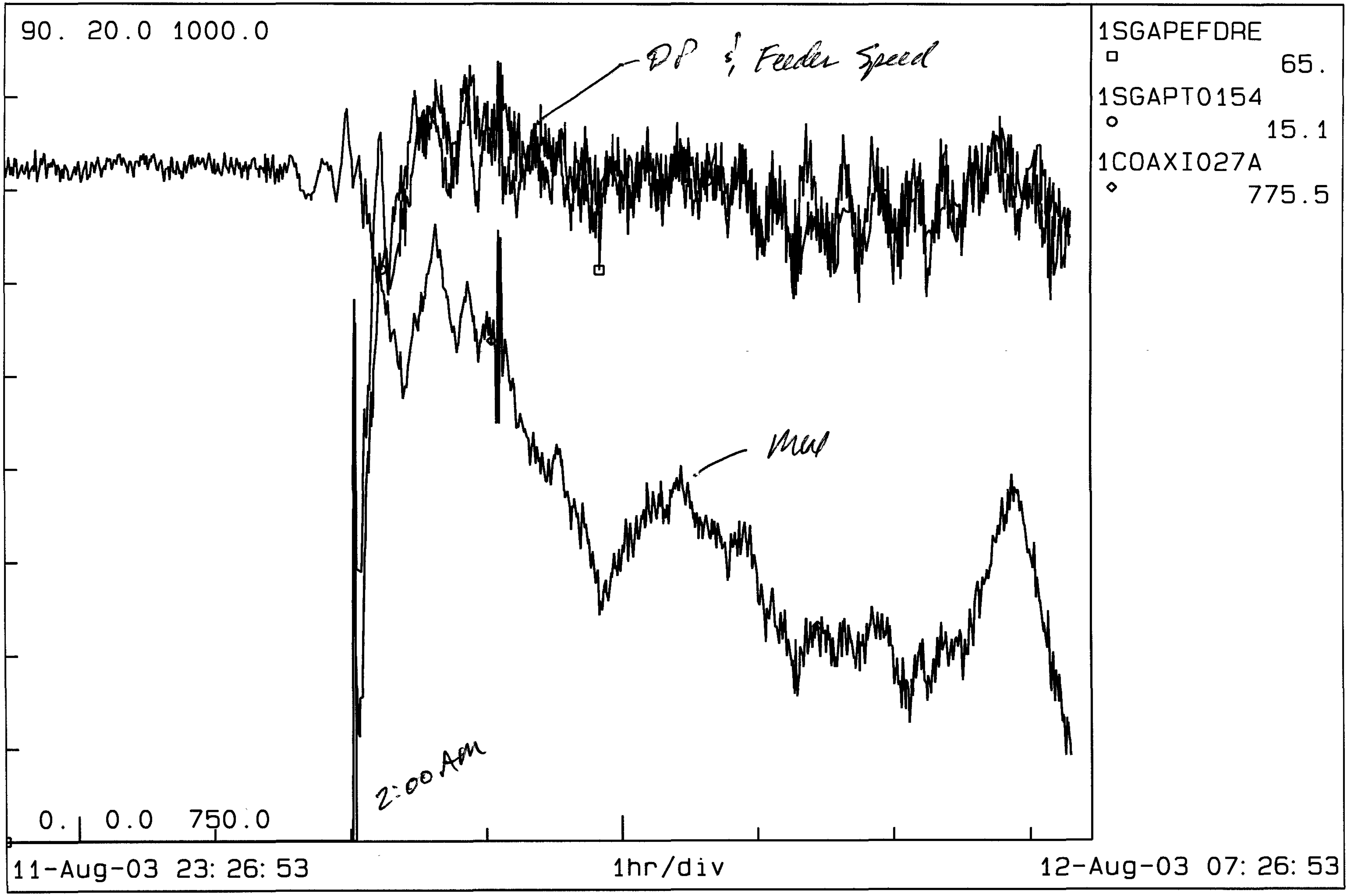
Unit 1 800.3 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow 314.6 TPH	40.6	44.0	43.2	44.6	42.7	42.6	Bad	40.8
Feeder Speed	55.6	61.6	59.1	60.9	58.6	58.9	Calc	56.4
Amps (Duct Pr 43.1)	59.5	51.9	68.4	57.2	59.4	55.7	0.0	53.5
Coal Pipe Vel	4247.	3829.	3482.	3503.	3794.	4174.	0.	4099.
PA Flow %	94.9	84.7	78.7	79.3	84.5	93.6	0.0	92.2
PA Damper Pos	74.2	76.7	66.7	67.5	78.1	77.6	0.0	83.8
Pulv Pitot DP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PA Mass Flow	3799.	3423.	3108.	3136.	3358.	3723.	0.	3695.
Pulv DP (NOx 0.35)	12.0	12.2	11.6	12.4	15.1	13.7	0.0	14.6
Air to Fuel Ratio	2.73	2.23	2.06	2.06	2.22	2.47	Calc	2.56
Pulv Inlet Temp	257.1	279.8	290.4	296.9	267.6	283.8	124.2	269.9
Pulv Outlet Temp	150.6	151.4	151.1	150.1	150.9	151.9	131.4	150.9
Coal Bias	-4.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.0
Air Bias	11.1	0.0	3.1	0.0	0.0	8.9	3.9	9.9
Hyd Skid Pr Fdbk	1782.	1875.	2286.	2243.	2064.	1866.	871.	1731.
Hyd Skid Pr Setpt	1893.	2017.	1989.	2036.	1955.	1964.	1149.	1900.

EndTim= 12-Aug-03 07:09:47 /EvalTim= 12-Aug-03 07:09:47 /PanRate= 0

IP12_001642

Printed out for: PHIL-H - 12-Aug-03 07:18:07

0 Messages U1 Pulv U1 Pulv Operating data 12-Aug-03 07:18:07



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IP12_001643

Printed out for: UNIT1OP - 11-Nov-03 16:25:00 90% End of Test

0 Messages U1 Pulv U1 Pulv Operating data BDI Rotating 11-Nov-03 16:25:00

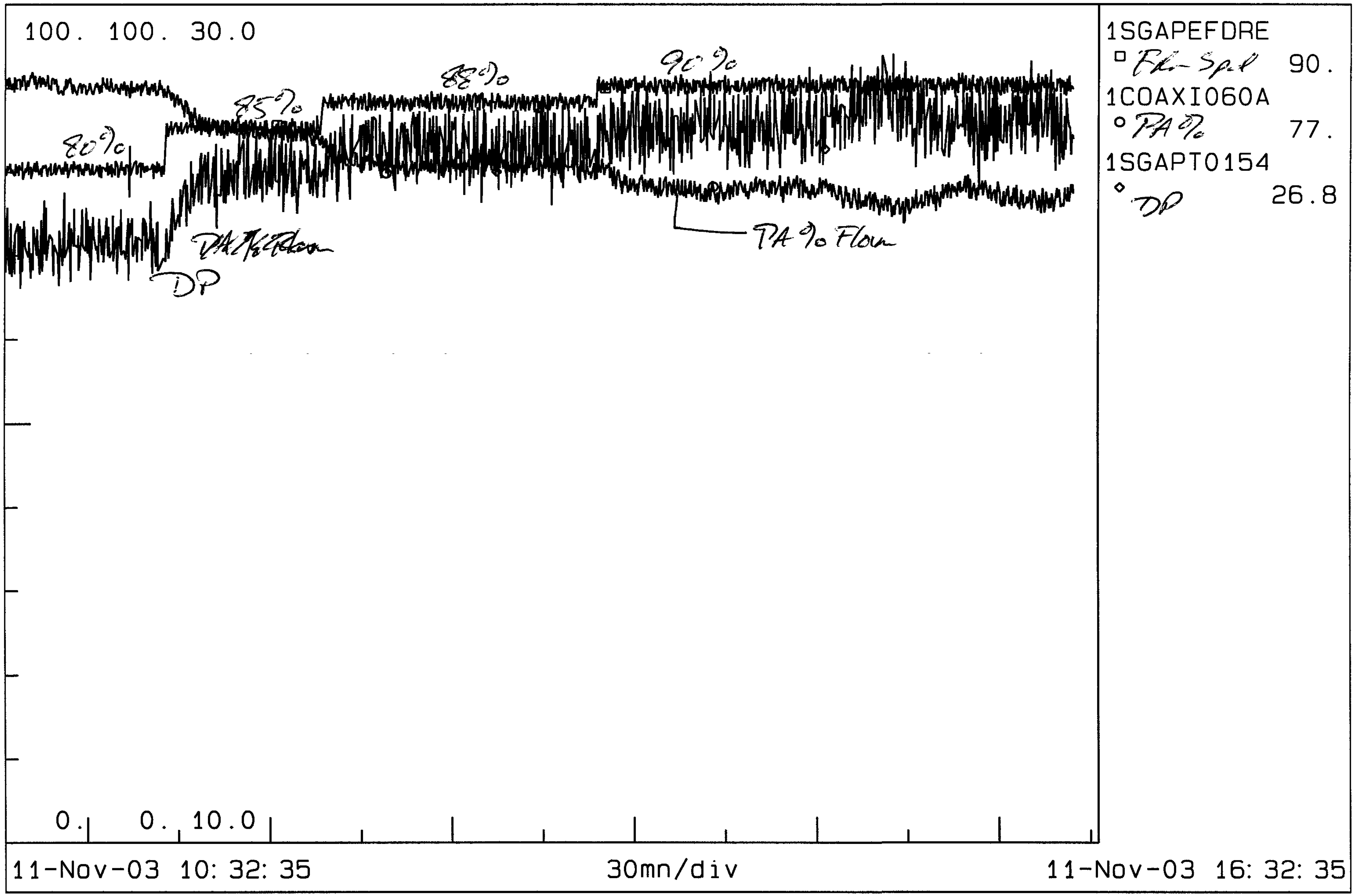
Unit 1 947.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow375.4TPH	47.7	54.0	52.8	53.1	61.4	0.2	52.0	54.6
Feeder Speed	70.2	76.8	76.9	78.8	90.7	0.2	76.8	79.6
Amps (Duct Pr44.1)	70.9	58.4	68.2	60.2	71.4	0.0	50.9	62.2
Coal Pipe Vel	4083.	4003.	3963.	3995.	3451.	0.	4226.	4178.
PA Flow %	92.7	90.3	89.7	90.0	77.8	0.0	96.3	94.9
PA Damper Pos	75.3	82.2	72.7	71.6	100.	1.3	78.7	84.4
SA Damper Pos	66.1	74.4	75.6	74.7	88.5	44.9	74.1	75.1
PA Mass Flow	3663.	3585.	3553.	3583.	3092.	0.	3813.	3738.
Pulv DP (NOx 0.36)	13.5	14.9	12.6	14.7	26.7	0.0	11.3	18.3
Air to Fuel Ratio	2.32	2.02	2.04	2.04	1.50	0.00	2.20	2.07
Pulv Inlet Temp	312.0	330.5	329.0	315.2	389.1	87.4	296.0	354.9
Pulv Outlet Temp	149.7	151.5	150.6	151.9	151.1	88.0	150.9	150.0
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2342.	2290.	2297.	2266.	2317.	2.	2239.	2290.
Hyd Skid Pr Setpt	2154.	2387.	2341.	2351.	2400.	1149.	2313.	2400.

EndTim= 11-Nov-03 16:25:00 /EvalTim= 11-Nov-03 16:25:00 /PanRate= 0

90% End of Test

Printed out for: UNIT1OP - 11-Nov-03 16:24:51

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 16:24:51



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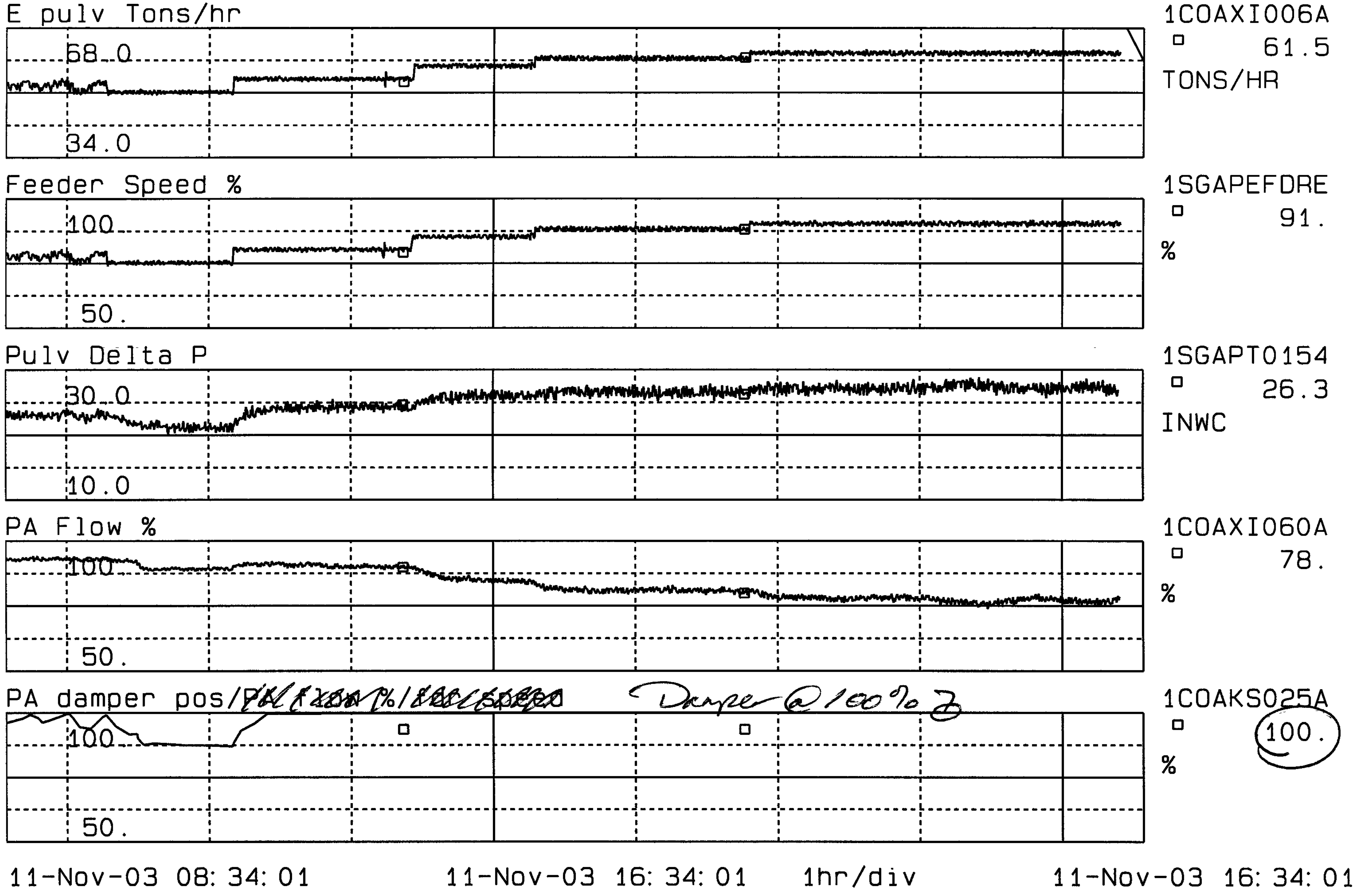
IP12_001645

90% End of Test

Printed out for: UNIT1OP - 11-Nov-03 16:24:24

0 Messages GARRY'S2 TEST PAGE 11-Nov-03 16:24:24



90% Fdr Spd

Printed out for: UNIT1OP - 11-Nov-03 15:06:49

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 15:06:49

Unit 1 947.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow372.7TPH	46.8	53.9	52.3	52.1	61.4	0.2	51.6	54.0
Feeder Speed	68.9	78.8	77.0	77.6	89.9	0.2	76.1	79.0
Amps (Duct Pr44.2)	68.2	57.7	64.5	61.0	77.0	0.0	50.7	61.9
Coal Pipe Vel	4082.	3958.	3941.	4009.	3428.	0.	4212.	4114.
PA Flow %	92.7	90.3	89.8	89.9	77.4	0.0	95.6	94.1
PA Damper Pos	75.3	82.4	72.7	71.7	100.	1.3	80.4	83.9
SA Damper Pos	65.6	73.9	75.3	74.3	88.8	44.8	73.7	74.6
PA Mass Flow	3658.	3542.	3531.	3555.	3097.	0.	3772.	3743.
Pulv DP (NOx 0.36)	13.5	15.3	12.5	15.3	27.2	0.0	11.4	17.9
Air to Fuel Ratio	2.25	1.97	2.00	1.99	1.52	0.00	2.16	2.01
Pulv Inlet Temp	312.0	330.4	327.7	319.6	383.3	86.3	295.2	353.6
Pulv Outlet Temp	150.9	151.9	151.4	152.3	151.1	87.5	151.4	150.4
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2349.	2289.	2296.	2258.	2318.	2.	2162.	2298.
Hyd Skid Pr Setpt	2119.	2381.	2322.	2297.	2400.	1149.	2299.	2384.

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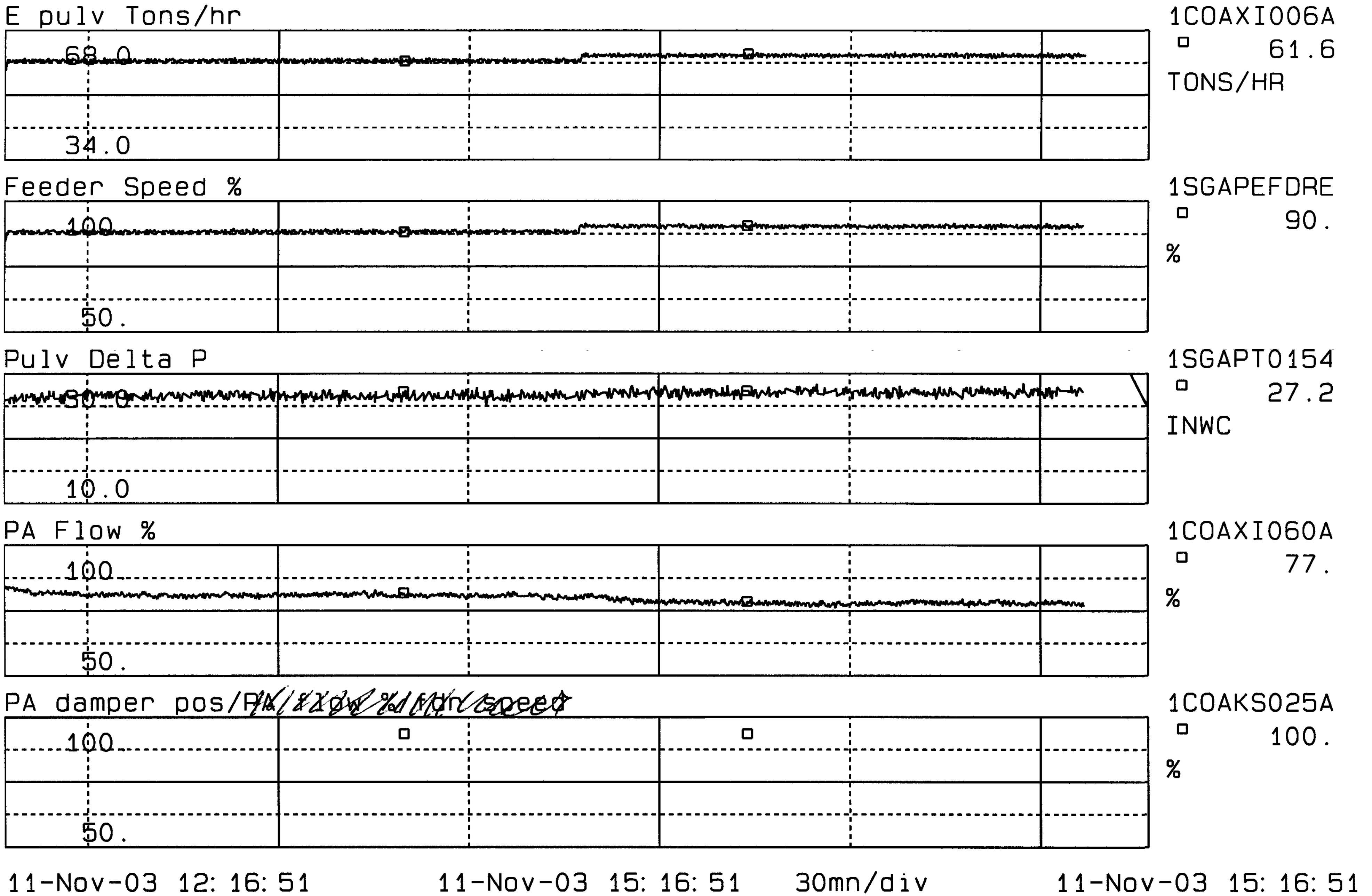
IP12_001647

Printed out for: UNIT1OP - 11-Nov-03 15:06:59

0 Messages GARRY'S2 TEST PAGE

90% Fdr Spd

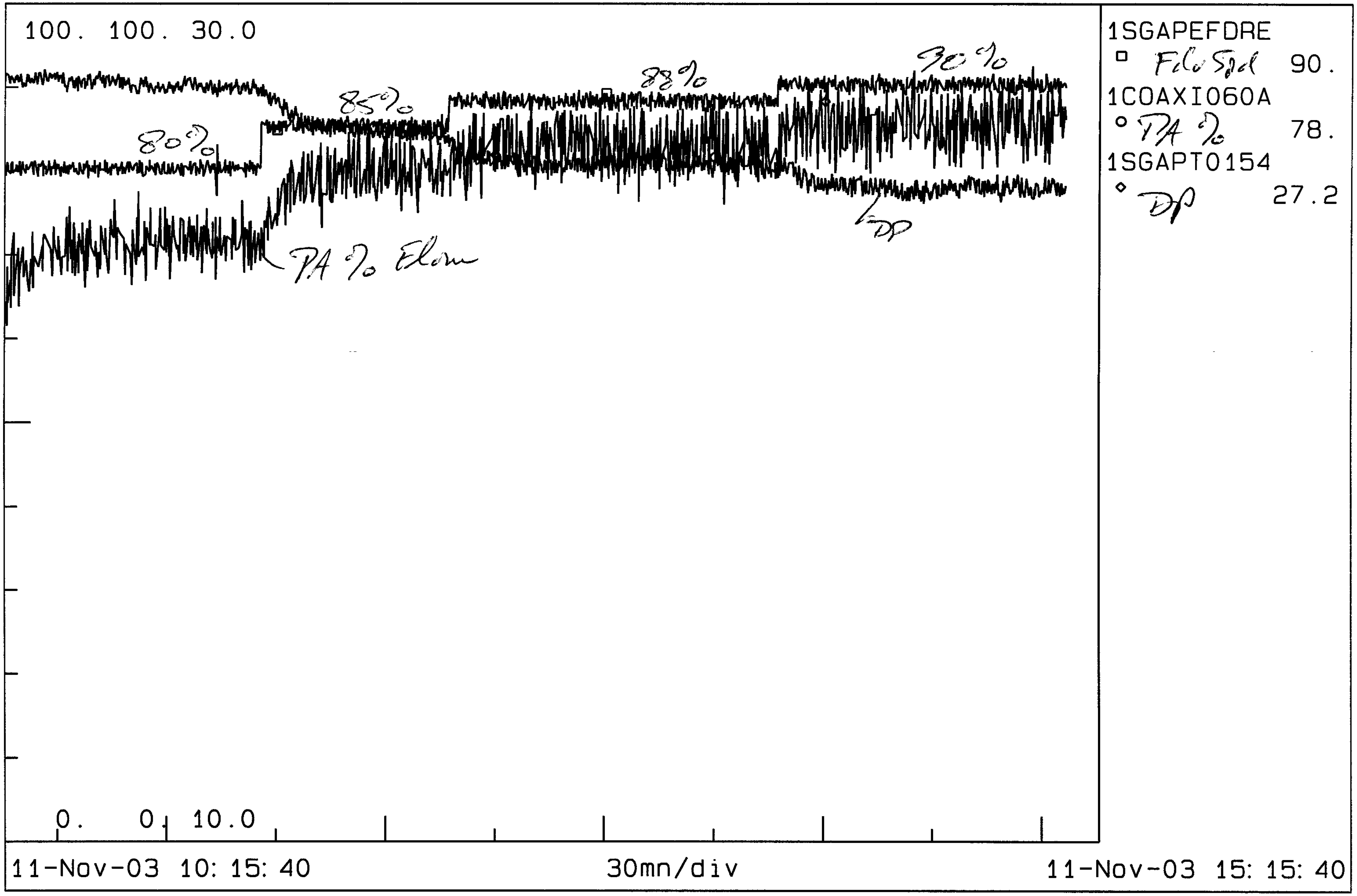
11-Nov-03 15:06:59



Printed out for: UNIT1OP - 11-Nov-03 15:06:39

90% Fdr Spd

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 15:06:39



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88%

Printed out for: UNIT1OP - 11-Nov-03 13:40:02

0 Messages U1 Pulv U1 Pulv Operating data BPR Throat Test 11-Nov-03 13:40:02

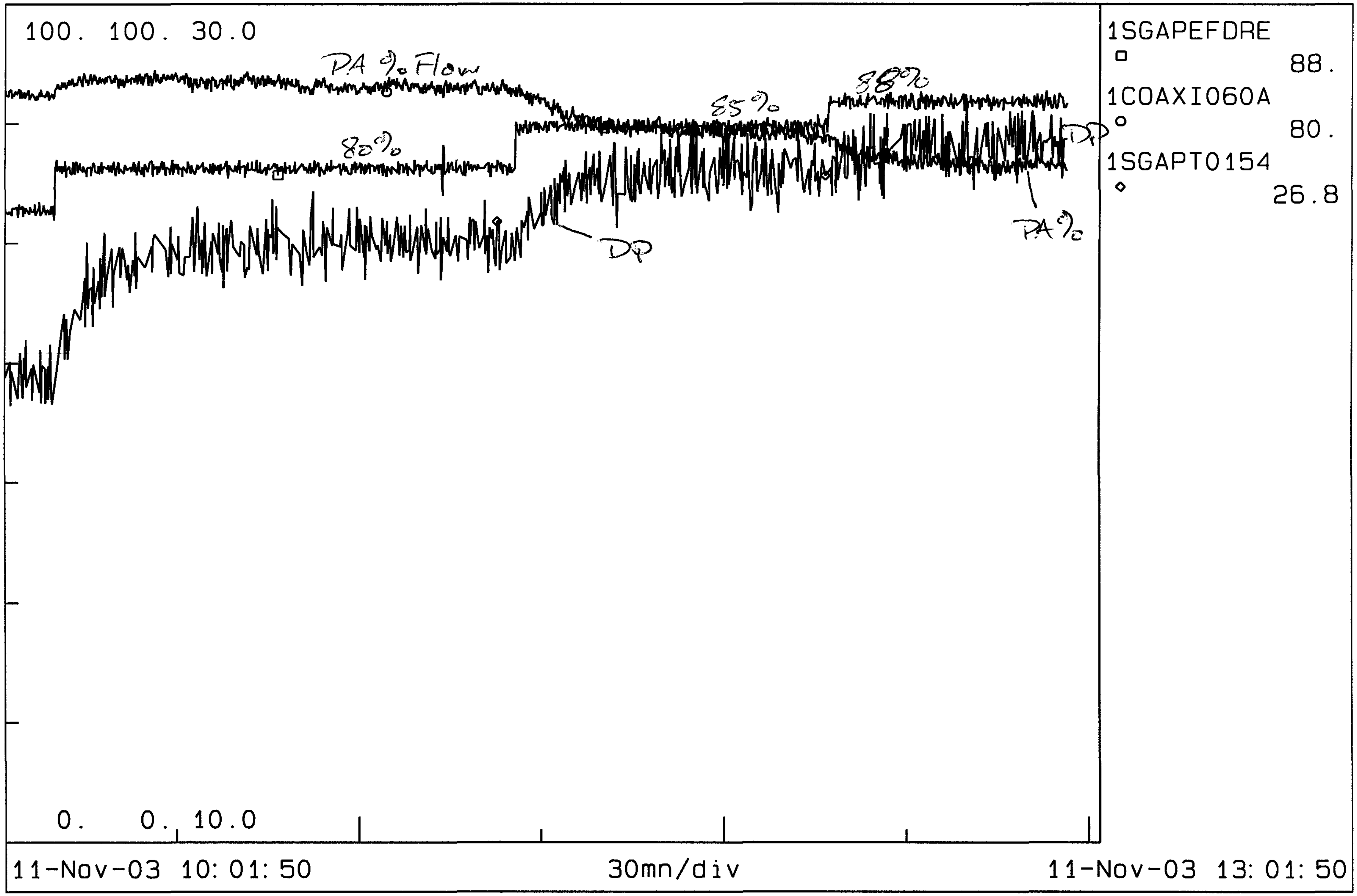
Unit 1 952.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow369.0TPH	46.8	52.9	53.3	52.7	60.1	0.2	51.5	53.7
Feeder Speed	69.8	79.2	77.2	76.3	88.9	0.2	75.9	77.7
Amps (Duct Pr43.9)	73.0	59.7	68.4	59.7	73.2	0.0	50.0	62.4
Coal Pipe Vel	4074.	3996.	3957.	3969.	3553.	0.	4198.	4160.
PA Flow %	93.1	90.0	89.1	89.5	80.2	0.0	94.3	93.7
PA Damper Pos	74.6	81.9	72.2	71.2	100.	1.3	80.5	83.8
SA Damper Pos	64.8	73.0	74.6	73.3	87.3	44.8	72.8	73.8
PA Mass Flow	3657.	3579.	3548.	3525.	3183.	0.	3761.	3693.
Pulv DP (NOx 0.35)	13.6	15.3	12.2	14.7	26.8	0.0	11.5	18.2
Air to Fuel Ratio	2.34	2.04	2.08	2.04	1.59	0.00	2.22	2.11
Pulv Inlet Temp	$\boxed{298.7}$	325.7	323.6	315.0	374.0	84.2	298.7	357.1
Pulv Outlet Temp	150.8	151.9	151.1	151.9	150.9	87.3	151.3	150.9
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2348.	2292.	2297.	2258.	2318.	2.	2245.	2290.
Hyd Skid Pr Setpt	2119.	2343.	2360.	2344.	2400.	1149.	2290.	2373.

EndTim= 11-Nov-03 13:40:02 /EvalTim= 11-Nov-03 13:40:02 /PanRate= 0

88%

Printed out for: UNIT1OP - 11-Nov-03 13: 41: 20

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 13: 41: 20



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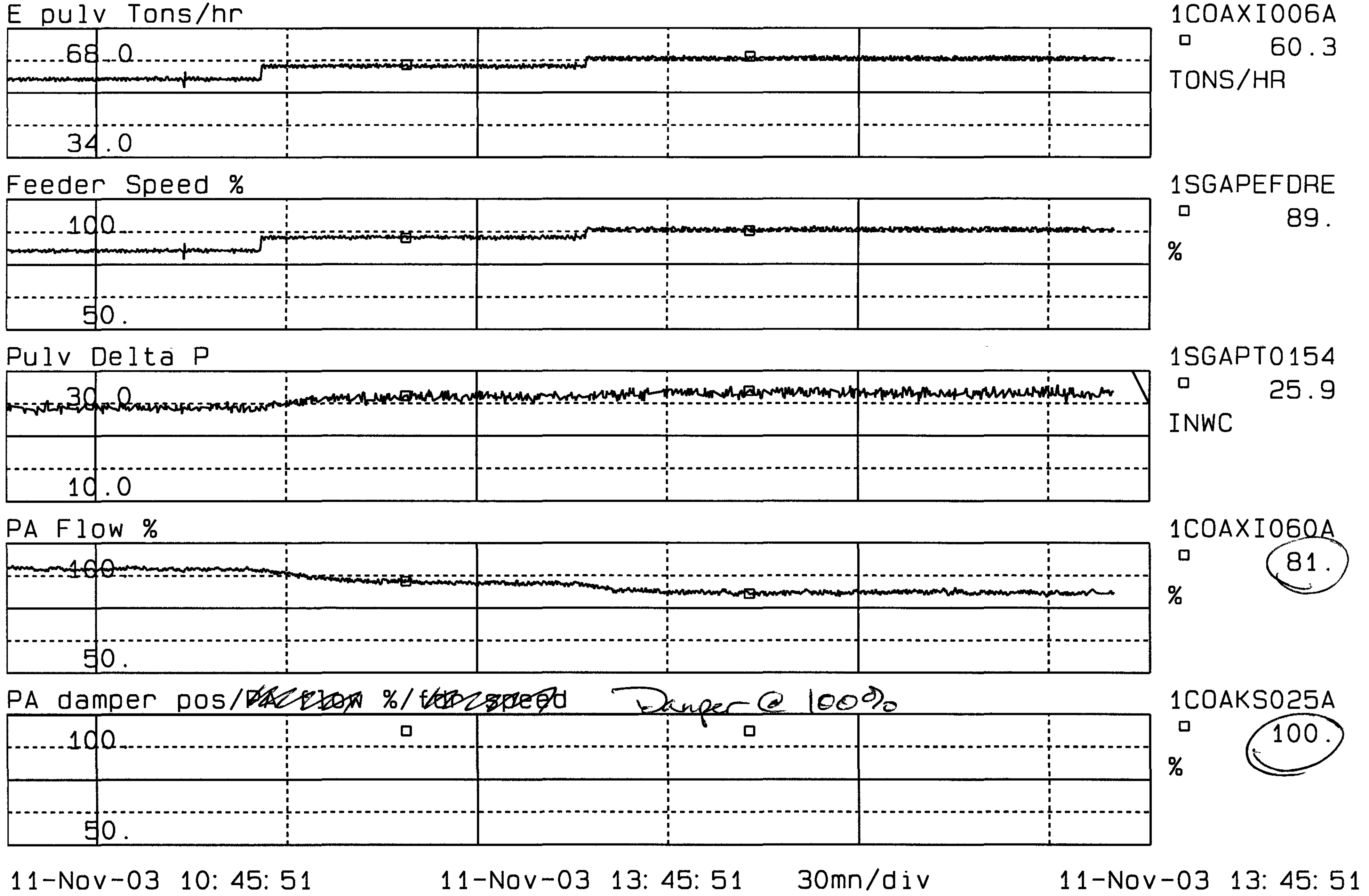
IP12_001651

Printed out for: UNIT1OP - 11-Nov-03 13: 40: 21

88%

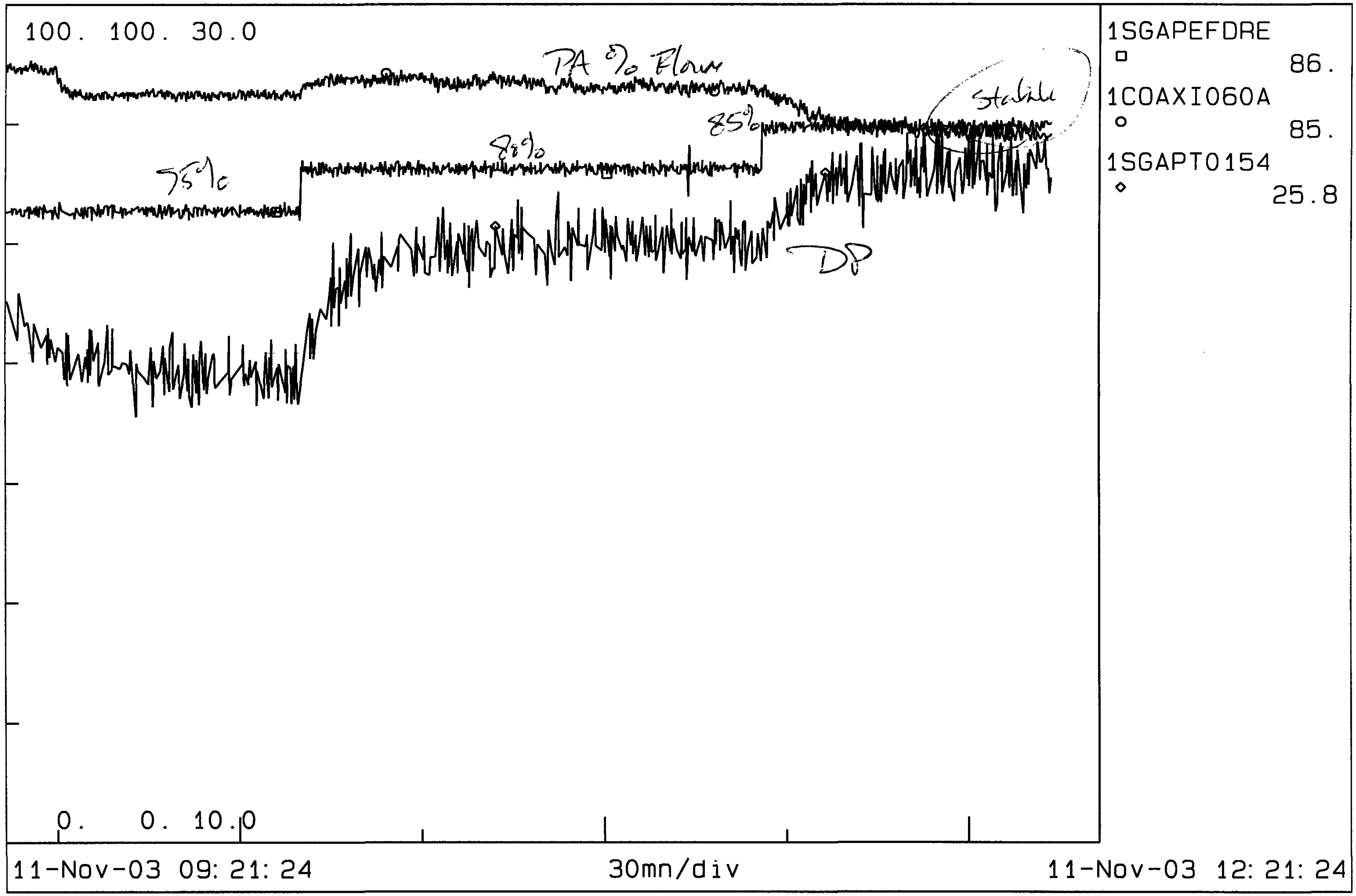
0 Messages GARRY'S2 TEST PAGE 11-Nov-03 13: 40: 21



Printed out for: UNIT1OP - 11-Nov-03 12: 13: 39

85% Stable

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 12: 13: 39



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Printed out for: UNIT1OP - 11-Nov-03 12:13:52 85% Fdr Spd.

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 12:13:52

Unit 1 949.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow368.9TPH	46.8	53.3	52.4	52.5	58.3	0.2	51.1	54.0
Feeder Speed	68.5	79.7	76.7	77.5	85.8	0.2	75.7	77.7
Amps (Duct Pr44.1)	69.0	59.5	70.0	58.7	71.7	0.0	51.4	62.0
Coal Pipe Vel	4098.	3965.	3937.	3951.	3697.	0.	4216.	4128.
PA Flow %	92.4	90.2	89.2	89.7	83.7	0.0	94.9	93.8
PA Damper Pos	75.7	82.1	72.4	71.1	100.	1.3	76.5	84.0
SA Damper Pos	64.7	72.9	74.4	73.1	84.1	44.8	72.6	73.7
PA Mass Flow	3682.	3555.	3533.	3540.	3322.	0.	3739.	3708.
Pulv DP (NOx 0.38)	13.5	15.6	12.6	15.6	25.8	0.0	10.5	17.8
Air to Fuel Ratio	2.36	2.01	2.04	2.03	1.72	0.00	2.17	2.06
Pulv Inlet Temp	305.3	322.1	321.1	310.8	355.5	81.9	315.9	357.7
Pulv Outlet Temp	150.1	151.5	150.9	151.9	150.1	87.3	151.3	150.3
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2348.	2292.	2297.	2258.	2318.	2.	2258.	2287.
Hyd Skid Pr Setpt	2124.	2358.	2325.	2309.	2400.	1149.	2279.	2387.

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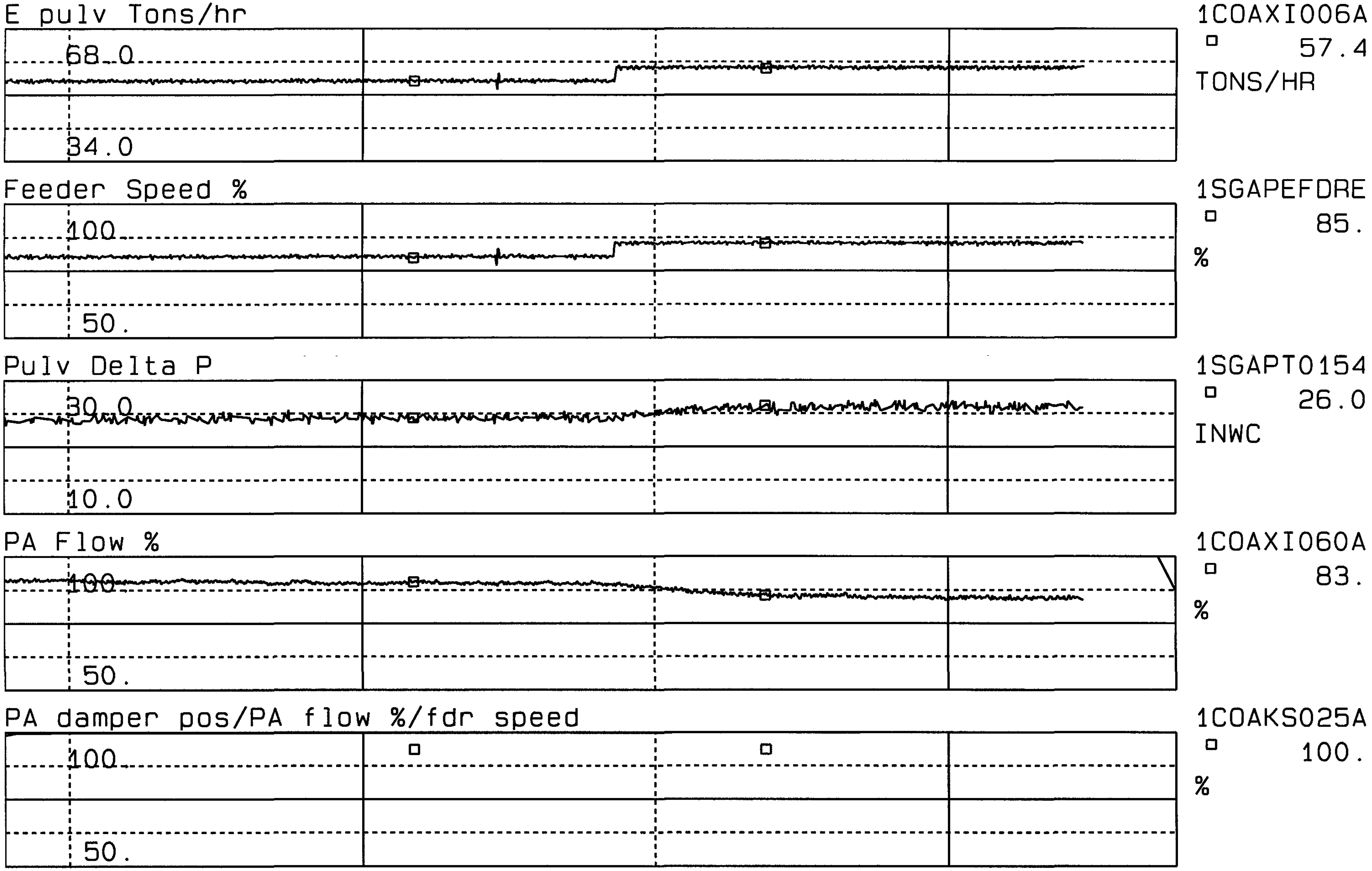
IP12_001654

Printed out for: UNIT1OP - 11-Nov-03 12:14:07

0 Messages GARRY'S2 TEST PAGE

85% Spd, Fdr

11-Nov-03 12:14:07

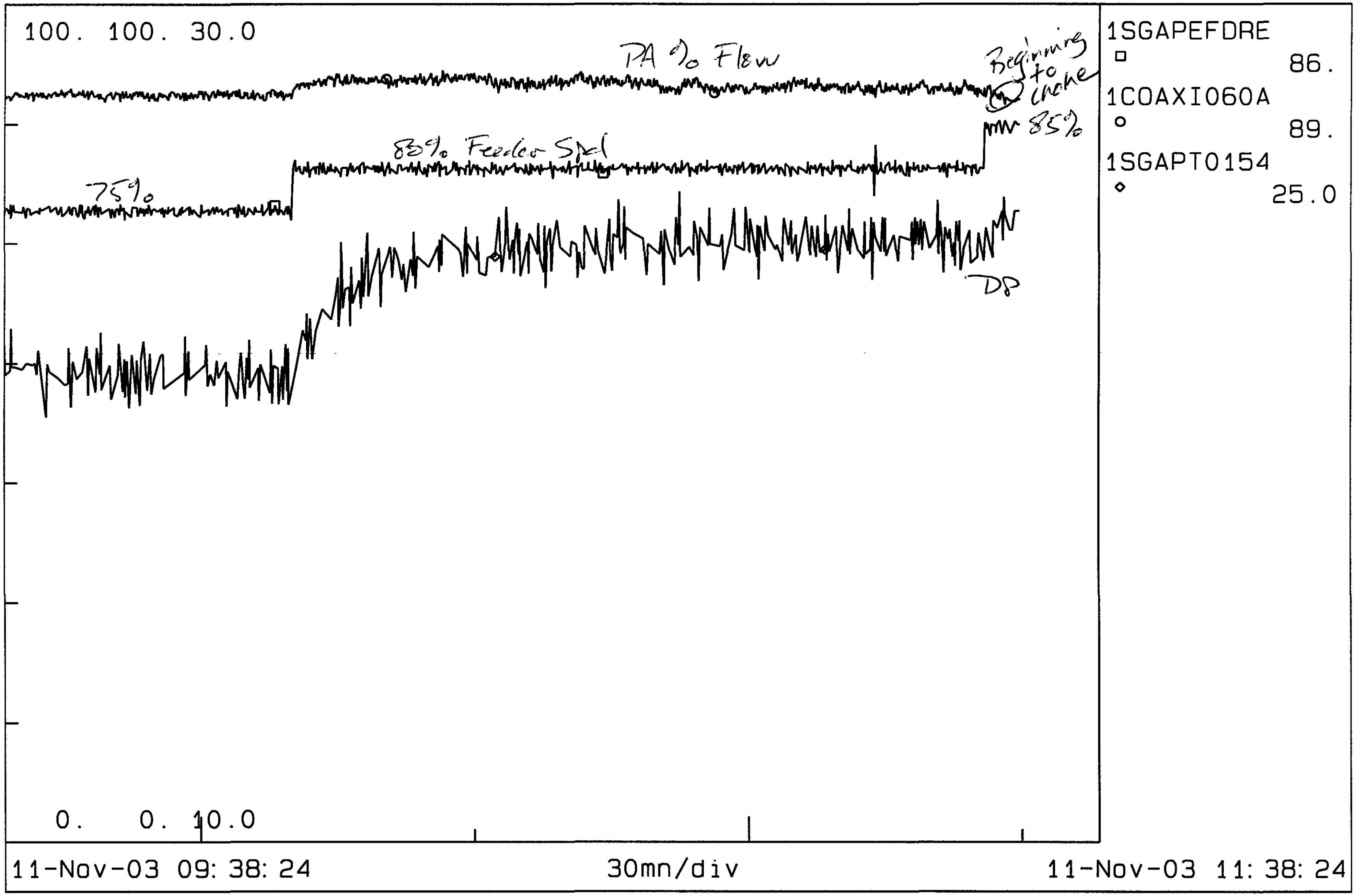


11-Nov-03 10:23:18 11-Nov-03 12:23:18 30mn/div 11-Nov-03 12:23:18

85%

Printed out for: UNIT1OP - 11-Nov-03 11:29:55

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 11:29:55



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Printed out for: UNIT1OP - 11-Nov-03 11:23:57 80% Fdr Spd. Stable

0 Messages U1 Pulv U1 Pulv Operating data BPR Throat 11-Nov-03 11:23:57

Unit 1 951.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow369.8TPH	47.6	53.2	51.6	53.6	55.1	0.2	52.0	54.5
Feeder Speed	71.0	79.8	77.9	78.1	80.2	0.2	77.5	78.9
Amps (Duct Pr44.2)	72.4	58.7	71.0	59.9	71.4	0.0	50.7	61.7
Coal Pipe Vel	4009.	4010.	3963.	3981.	3957.	0.	4188.	4161.
PA Flow %	91.9	90.8	89.7	90.5	90.1	0.0	94.3	94.6
PA Damper Pos	76.0	82.6	72.8	71.9	100.	1.3	81.9	84.7
SA Damper Pos	65.3	73.6	75.1	73.8	79.7	44.9	73.3	74.3
PA Mass Flow	3611.	3596.	3555.	3568.	3546.	0.	3797.	3742.
Pulv DP (NOx 0.35)	14.7	15.3	12.9	15.7	24.3	0.0	12.0	18.4
Air to Fuel Ratio	2.30	2.01	2.01	2.01	1.96	0.00	2.19	2.06
Pulv Inlet Temp	310.0	323.6	323.6	309.5	331.8	80.6	304.6	358.0
Pulv Outlet Temp	150.6	151.5	151.4	151.9	151.4	87.2	151.3	149.7
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2345.	2293.	2296.	2268.	2315.	3.	2267.	2288.
Hyd Skid Pr Setpt	2150.	2355.	2297.	2375.	2394.	1149.	2311.	2400.

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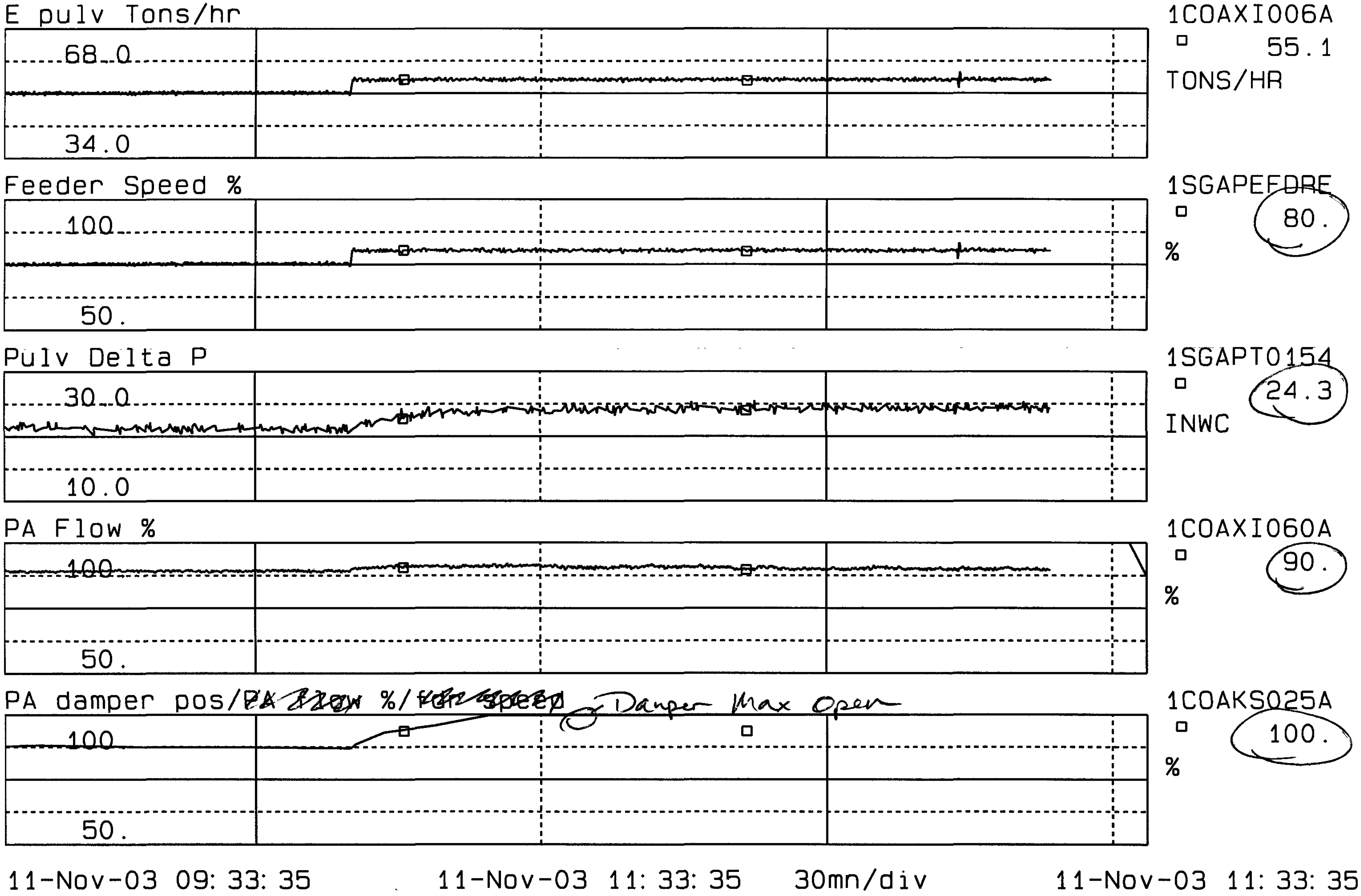
IP12_001657

Printed out for: UNIT1OP - 11-Nov-03 11:23:46

0 Messages GARRY'S2 TEST PAGE

80% Fdr Spd. Stabile

11-Nov-03 11:23:46



IP12_001658

75% 0% Bias. Stable

Printed out for: UNIT1OP - 11-Nov-03 10:09:09

0 Messages U1 Pulv U1 Pulv Operating data BPE Throats 11-Nov-03 10:09:09

Unit 1 945.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow369.6TPH	49.0	55.3	54.3	53.8	51.3	0.2	53.4	55.1
Feeder Speed	72.2	81.5	79.8	80.5	74.9	0.2	78.5	81.0
Amps (Duct Pr44.1)	71.9	59.5	66.7	62.4	70.5	0.0	50.4	61.9
Coal Pipe Vel	3949.	4026.	3973.	4003.	3938.	0.	4219.	4179.
PA Flow %	91.0	91.4	90.3	91.1	89.4	0.0	95.6	95.3
PA Damper Pos	76.9	82.8	73.4	72.7	86.6	1.3	79.3	86.2
SA Damper Pos	68.7	77.0	78.3	77.1	72.9	44.8	76.9	77.9
PA Mass Flow	3549.	3608.	3564.	3584.	3529.	0.	3792.	3756.
Pulv DP (NOx 0.35)	15.6	15.6	12.9	15.5	21.3	0.0	11.8	19.2
Air to Fuel Ratio	2.25	1.97	2.04	2.02	2.07	0.00	2.16	2.06
Pulv Inlet Temp	310.3	322.5	322.2	309.0	318.5	79.3	311.7	367.1
Pulv Outlet Temp	150.1	151.5	150.8	151.5	150.6	200.0	150.9	150.6
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2344.	2288.	2297.	2258.	2146.	2.	2283.	2287.
Hyd Skid Pr Setpt	2203.	2400.	2396.	2393.	2262.	1149.	2363.	2400.

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IP12_001659

75% 0% Bias
Stabile

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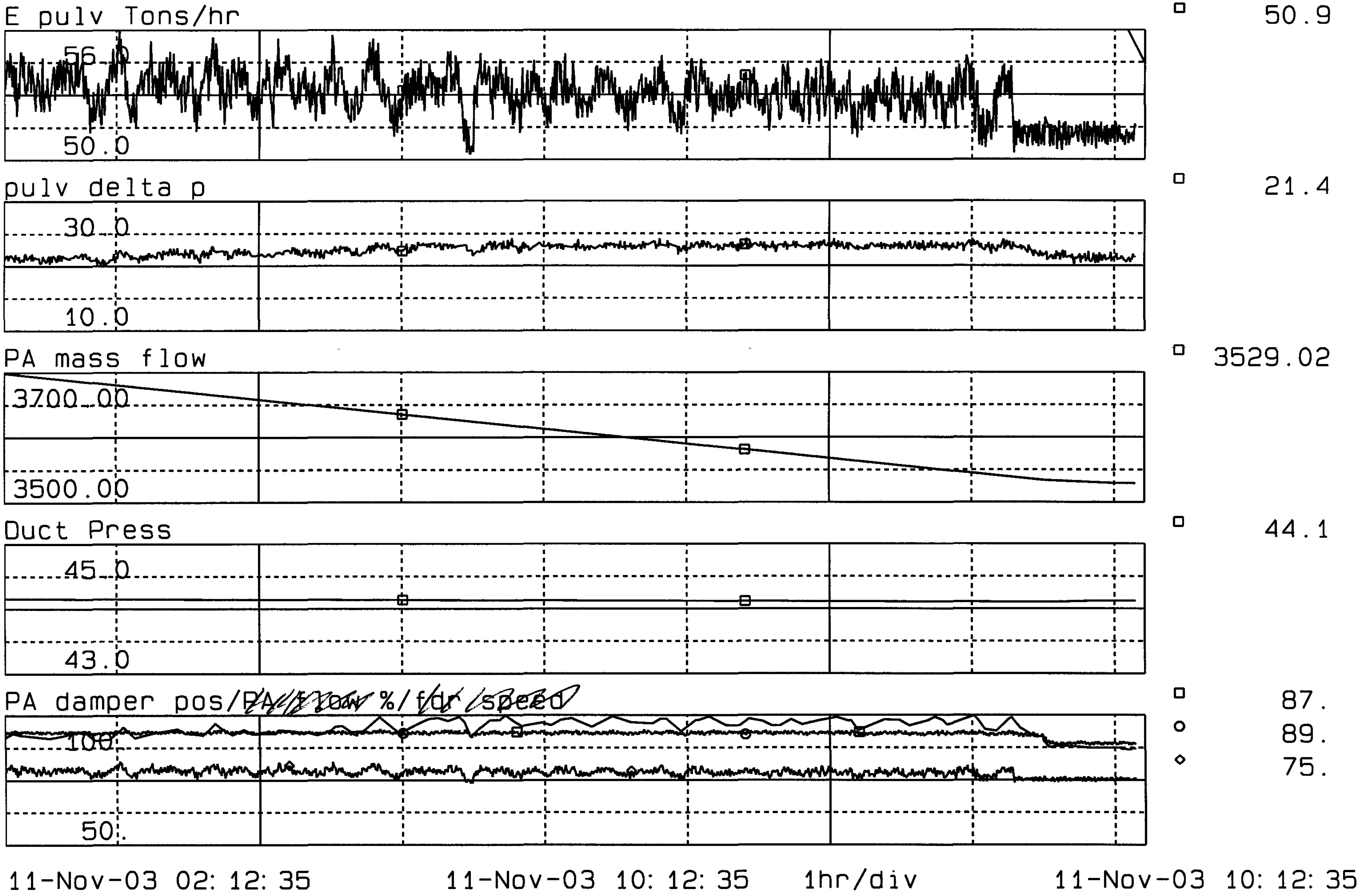

IP12_001660

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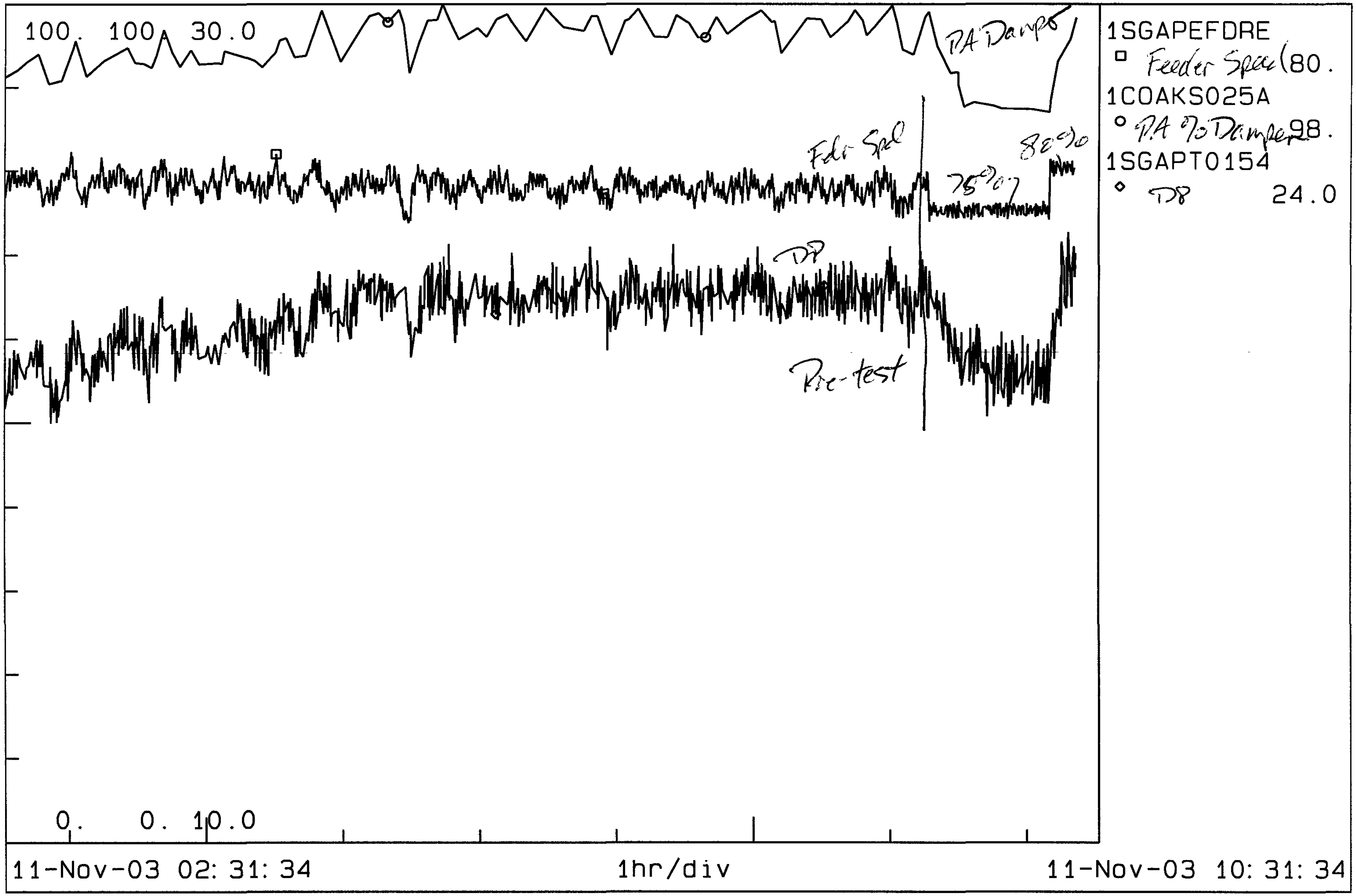
0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 10:21:44



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IP12_001661

Printed out for: UNIT1OP - 11-Nov-03 16:25:00

90% End of Test

0 Messages U1 Pulv U1 Pulv Operating data BDI Rotating 11-Nov-03 16:25:00

Unit 1 947.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow375.4TPH	47.7	54.0	52.8	53.1	61.4	0.2	52.0	54.6
Feeder Speed	70.2	76.8	76.9	78.8	90.7	0.2	76.8	79.6
Amps (Duct Pr44.1)	70.9	58.4	68.2	60.2	71.4	0.0	50.9	62.2
Coal Pipe Vel	4083.	4003.	3963.	3995.	3451.	0.	4226.	4178.
PA Flow %	92.7	90.3	89.7	90.0	77.8	0.0	96.3	94.9
PA Damper Pos	75.3	82.2	72.7	71.6	100.	1.3	78.7	84.4
SA Damper Pos	66.1	74.4	75.6	74.7	88.5	44.9	74.1	75.1
PA Mass Flow	3663.	3585.	3553.	3583.	3092.	0.	3813.	3738.
Pulv DP (NOx 0.36)	13.5	14.9	12.6	14.7	26.7	0.0	11.3	18.3
Air to Fuel Ratio	2.32	2.02	2.04	2.04	1.50	0.00	2.20	2.07
Pulv Inlet Temp	312.0	330.5	329.0	315.2	389.1	87.4	296.0	354.9
Pulv Outlet Temp	149.7	151.5	150.6	151.9	151.1	88.0	150.9	150.0
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2342.	2290.	2297.	2266.	2317.	2.	2239.	2290.
Hyd Skid Pr Setpt	2154.	2387.	2341.	2351.	2400.	1149.	2313.	2400.

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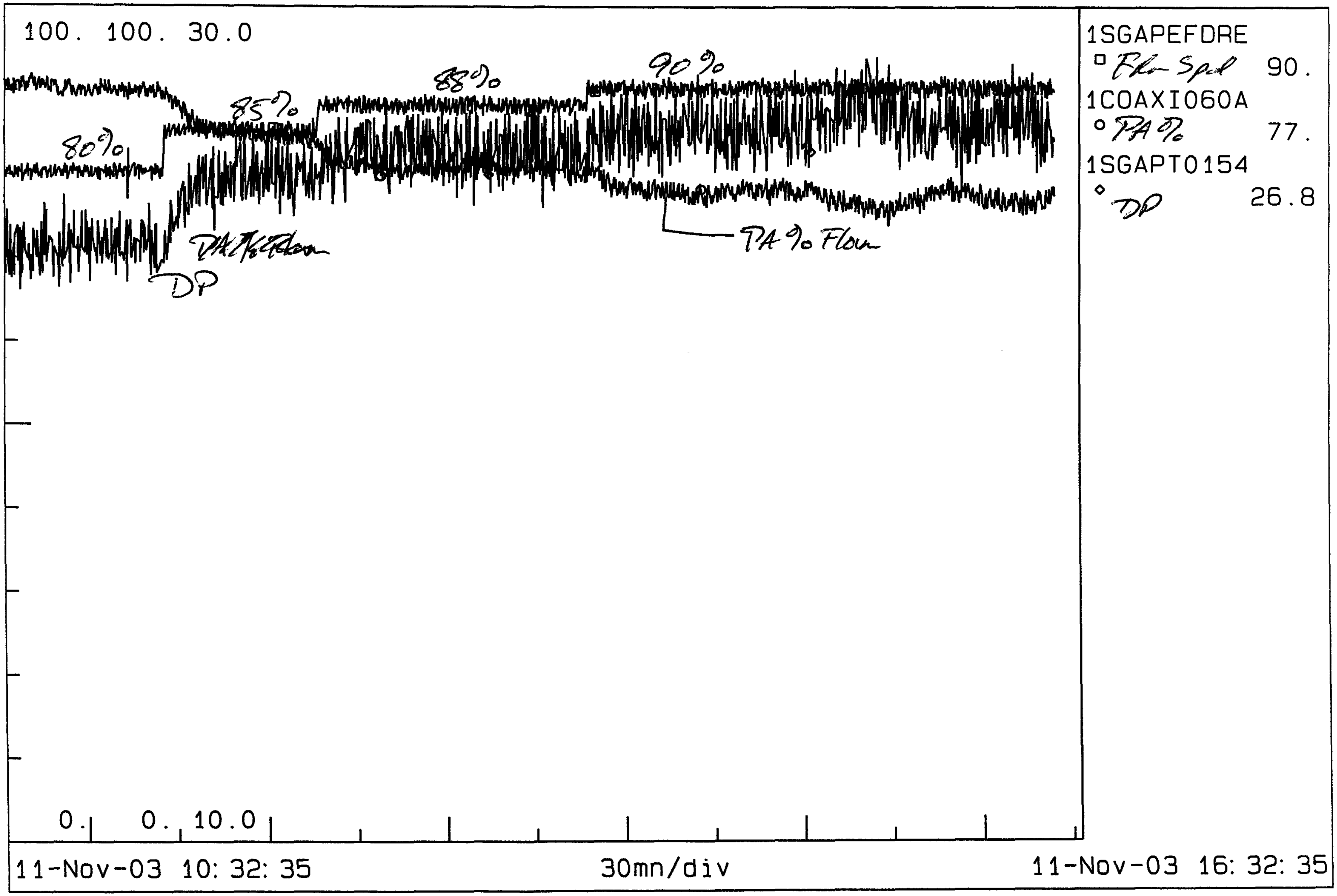
IP12_001662

90% End of Test

Printed out for: UNIT1OP - 11-Nov-03 16: 24: 51

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 16: 24: 51



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IP12_001663

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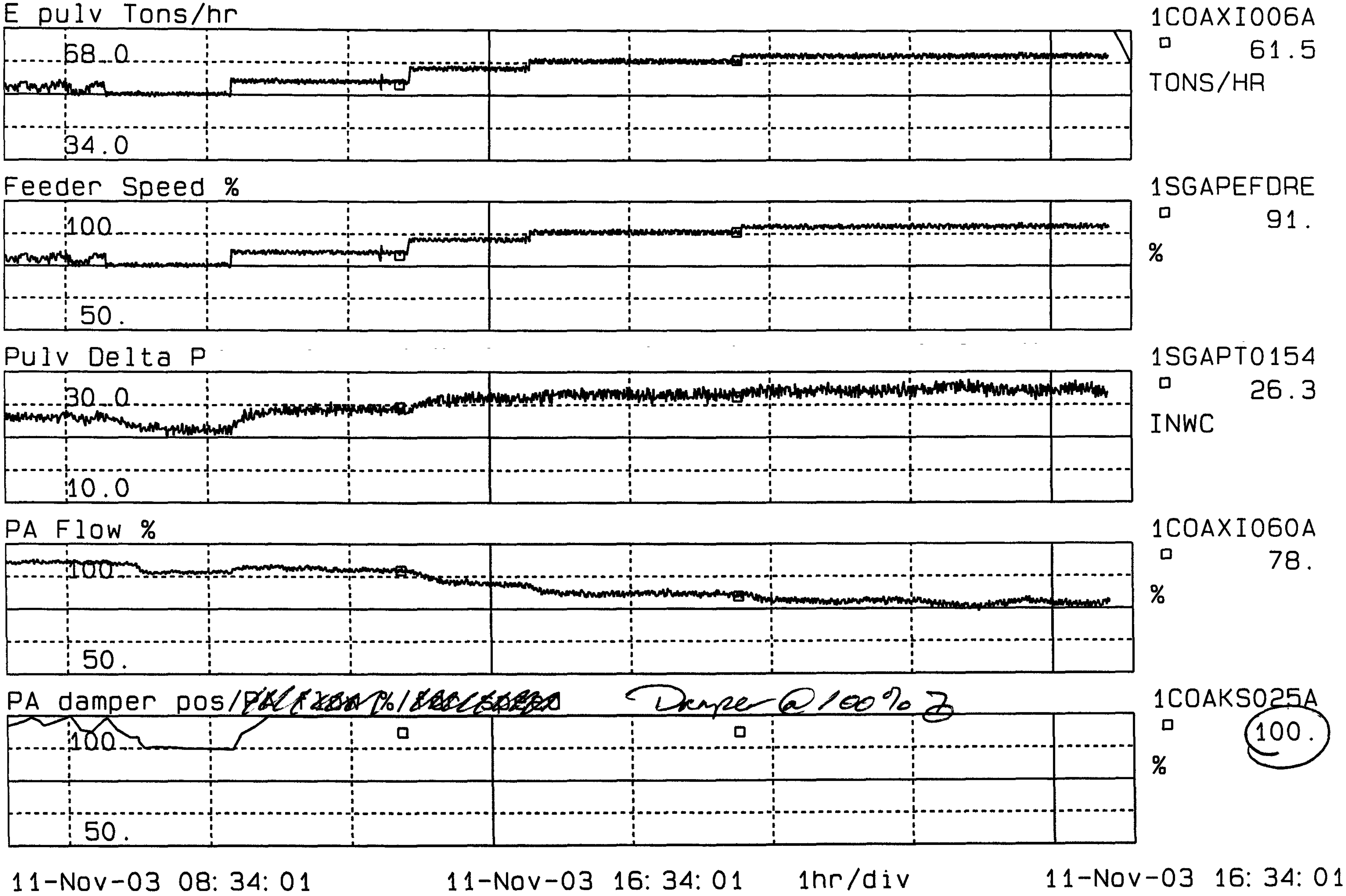
0 Messages GARRY'S2 TEST PAGE

90% End of Test

11-Nov-03 16:24:24



Printed out for: UNIT1OP - 11-Nov-03 15:06:49

90% Fdp Spl

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 15:06:49

Unit 1 947.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow372.7TPH	46.8	53.9	52.3	52.1	61.4	0.2	51.6	54.0
Feeder Speed	68.9	78.8	77.0	77.6	89.9	0.2	76.1	79.0
Amps (Duct Pr44.2)	68.2	57.7	64.5	61.0	77.0	0.0	50.7	61.9
Coal Pipe Vel	4082.	3958.	3941.	4009.	3428.	0.	4212.	4114.
PA Flow %	92.7	90.3	89.8	89.9	77.4	0.0	95.6	94.1
PA Damper Pos	75.3	82.4	72.7	71.7	100.	1.3	80.4	83.9
SA Damper Pos	65.6	73.9	75.3	74.3	88.8	44.8	73.7	74.6
PA Mass Flow	3658.	3542.	3531.	3555.	3097.	0.	3772.	3743.
Pulv DP (NOx 0.36)	13.5	15.3	12.5	15.3	27.2	0.0	11.4	17.9
Air to Fuel Ratio	2.25	1.97	2.00	1.99	1.52	0.00	2.16	2.01
Pulv Inlet Temp	312.0	330.4	327.7	319.6	383.3	86.3	295.2	353.6
Pulv Outlet Temp	150.9	151.9	151.4	152.3	151.1	87.5	151.4	150.4
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2349.	2289.	2296.	2258.	2318.	2.	2162.	2298.
Hyd Skid Pr Setpt	2119.	2381.	2322.	2297.	2400.	1149.	2299.	2384.

EndTim= 11-Nov-03 15:06:49 /EvalTim= 11-Nov-03 15:06:49 /PanRate= 0

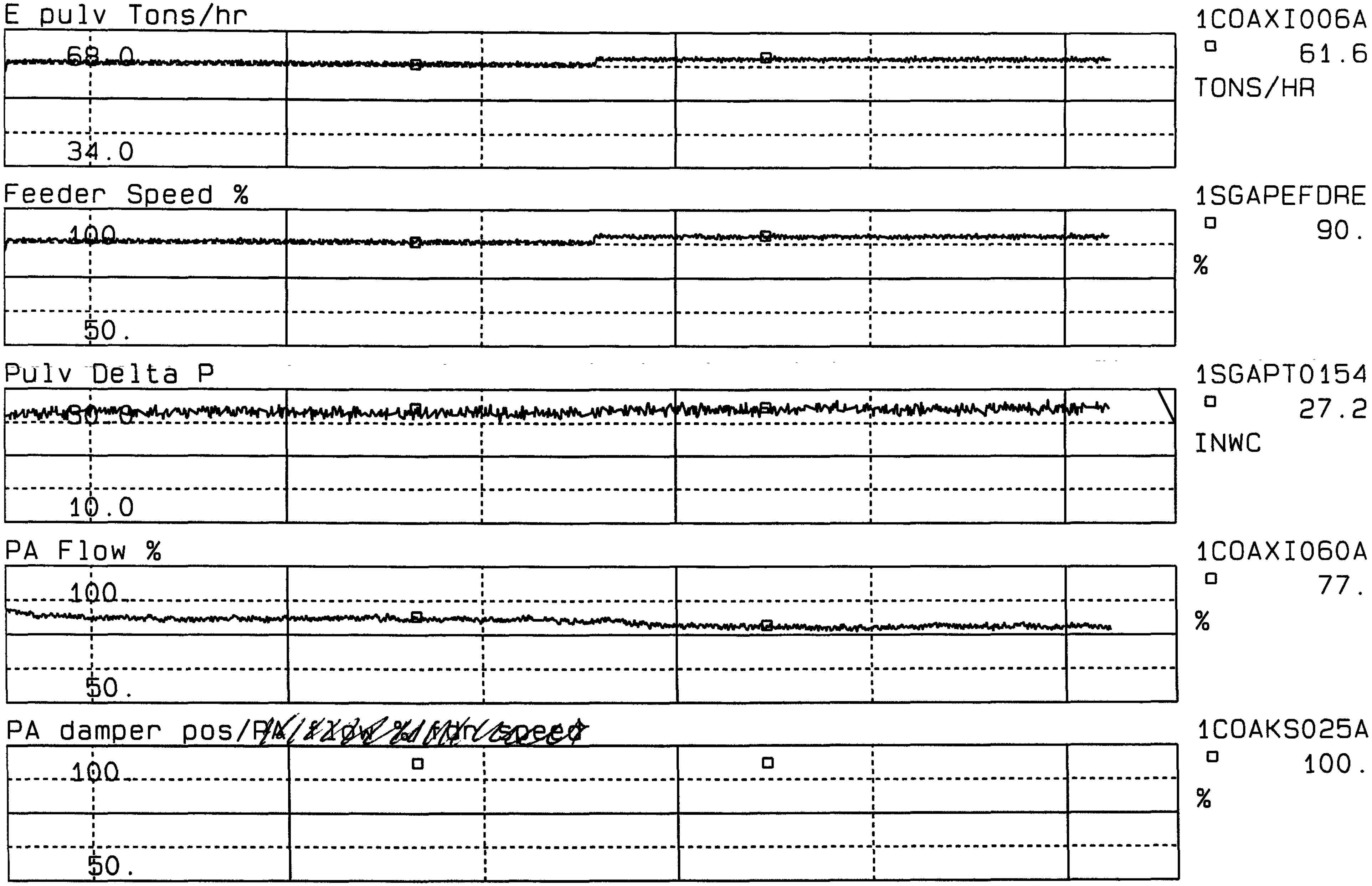
IP12_001665

Printed out for: UNIT10P - 11-Nov-03 15: 06: 59

0 Messages GARRY'S2 TEST PAGE

90% Fdr Spd

11-Nov-03 15: 06: 59



11-Nov-03 12: 16: 51 11-Nov-03 15: 16: 51 30mn/div 11-Nov-03 15: 16: 51

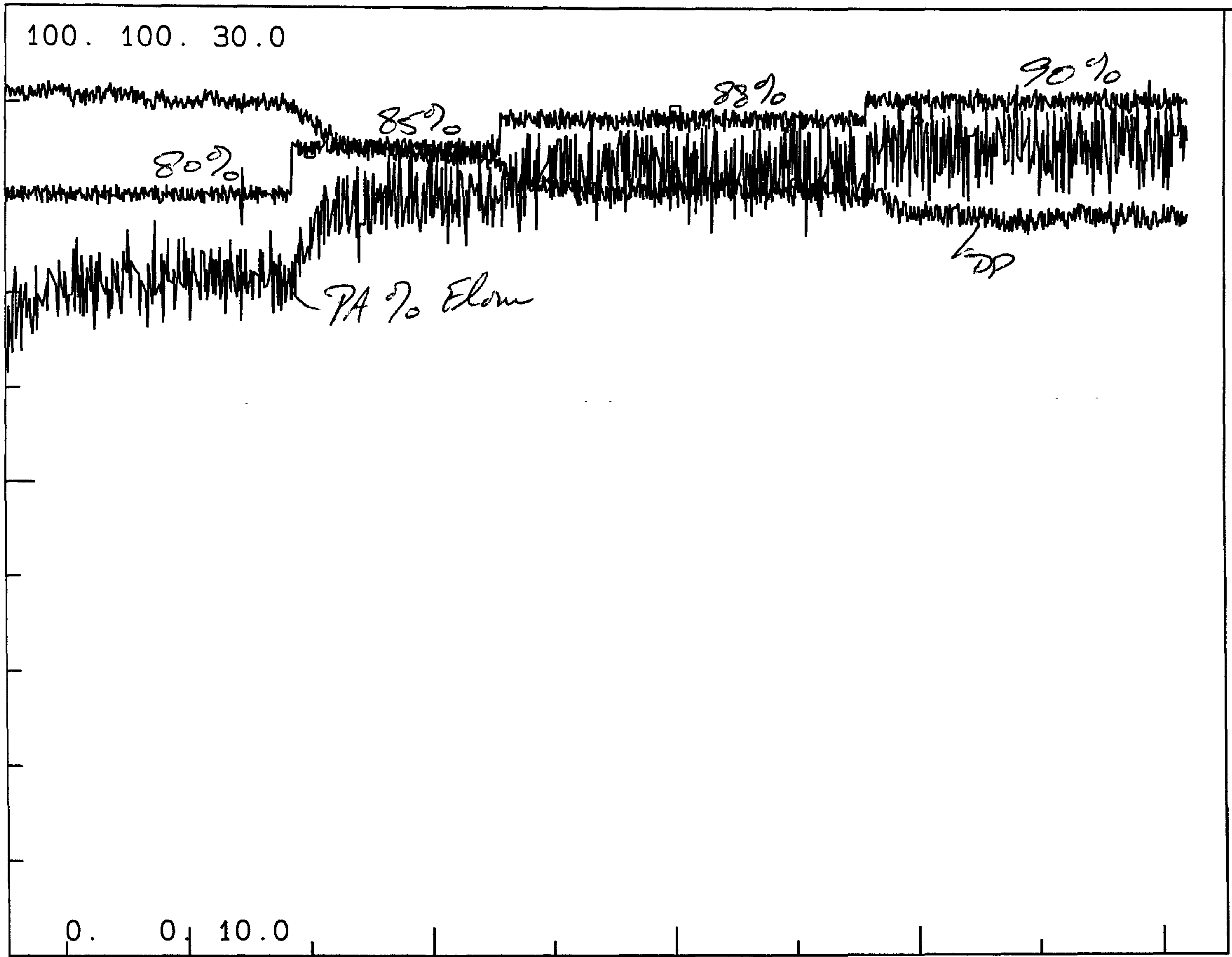
IP12_001666

Printed out for: UNIT1OP - 11-Nov-03 15:06:39

90% Fdr Spd

0 Messages U1 Pulv U1 Pulv Operating data

11-Nov-03 15:06:39



1SGAPEFDRE
□ Fdr Spd 90.
1COAXI060A
○ PA % 78.
1SGAPT0154
◇ DP 27.2

11-Nov-03 10:15:40 30mn/div 11-Nov-03 15:15:40

EndTim= 11-Nov-03 15:06:39 /EvalTim= 11-Nov-03 15:06:39 /PanRate= 0

Printed out for: UNIT1OP - 11-Nov-03 13:40:02 88%
0 Messages U1 Pulv U1 Pulv Operating data RP2 Throat Test 11-Nov-03 13:40:02

Unit 1 952.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow369.0TPH	46.8	52.9	53.3	52.7	60.1	0.2	51.5	53.7
Feeder Speed	69.8	79.2	77.2	76.3	88.9	0.2	75.9	77.7
Amps (Duct Pr43.9)	73.0	59.7	68.4	59.7	73.2	0.0	50.0	62.4
Coal Pipe Vel	4074.	3996.	3957.	3969.	3553.	0.	4198.	4160.
PA Flow %	93.1	90.0	89.1	89.5	80.2	0.0	94.3	93.7
PA Damper Pos	74.6	81.9	72.2	71.2	100.	1.3	80.5	83.8
SA Damper Pos	64.8	73.0	74.6	73.3	87.3	44.8	72.8	73.8
PA Mass Flow	3657.	3579.	3548.	3525.	3183.	0.	3761.	3693.
Pulv DP (NOx 0.35)	13.6	15.3	12.2	14.7	26.8	0.0	11.5	18.2
Air to Fuel Ratio	2.34	2.04	2.08	2.04	1.59	0.00	2.22	2.11
Pulv Inlet Temp	298.7	325.7	323.6	315.0	374.0	84.2	298.7	357.1
Pulv Outlet Temp	150.8	151.9	151.1	151.9	150.9	87.3	151.3	150.9
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2348.	2292.	2297.	2258.	2318.	2.	2245.	2290.
Hyd Skid Pr Setpt	2119.	2343.	2360.	2344.	2400.	1149.	2290.	2373.

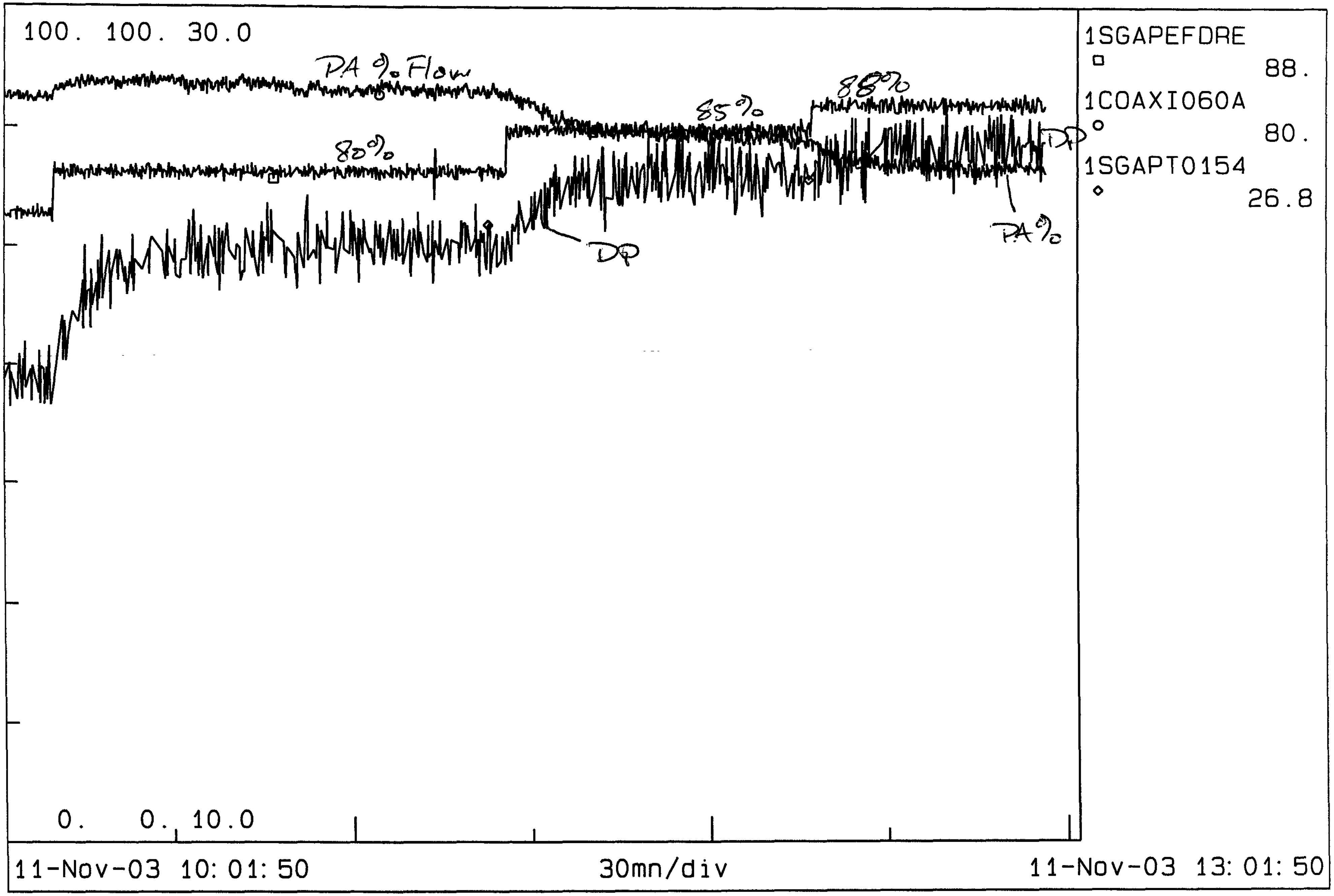
EndTim= 11-Nov-03 13:40:02 /EvalTim= 11-Nov-03 13:40:02 /PanRate= 0

IP12_001668

88%

Printed out for: UNIT1OP - 11-Nov-03 13: 41: 20

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 13: 41: 20



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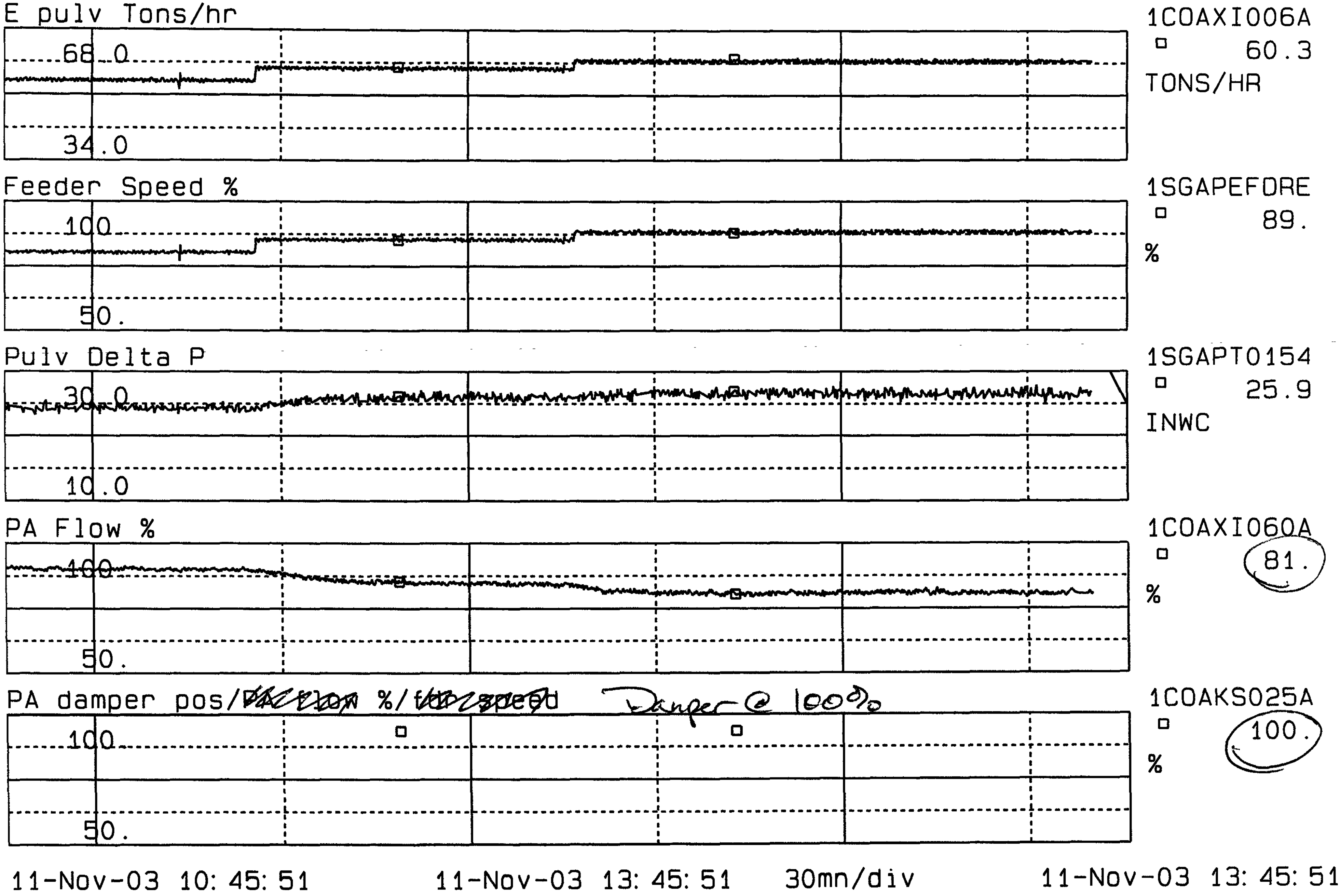
IP12_001669

88%

Printed out for: UNIT1OP - 11-Nov-03 13:40:21
0 Messages GARRY'S2 TEST PAGE 11-Nov-03 13:40:21

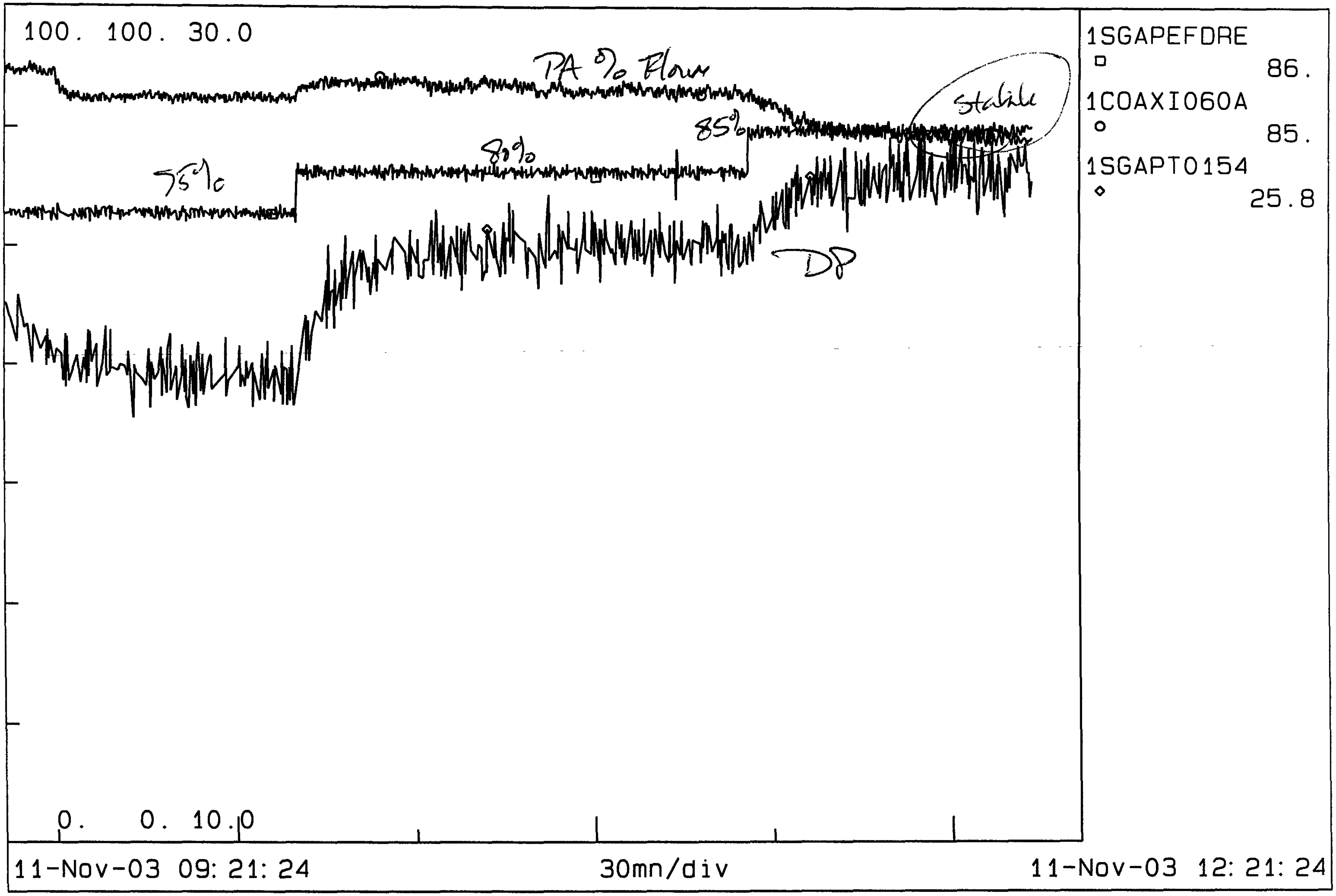


IP12_001670

Printed out for: UNIT1OP - 11-Nov-03 12:13:39

85% Stable

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 12:13:39



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IP12_001671

Printed out for: UNIT1OP - 11-Nov-03 12: 13: 52

85% Fdr Spd.

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 12: 13: 52

Unit 1 949.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow368.9TPH	46.8	53.3	52.4	52.5	58.3	0.2	51.1	54.0
Feeder Speed	68.5	79.7	76.7	77.5	85.8	0.2	75.7	77.7
Amps (Duct Pr44.1)	69.0	59.5	70.0	58.7	71.7	0.0	51.4	62.0
Coal Pipe Vel	4098.	3965.	3937.	3951.	3697.	0.	4216.	4128.
PA Flow %	92.4	90.2	89.2	89.7	83.7	0.0	94.9	93.8
PA Damper Pos	75.7	82.1	72.4	71.1	100.	1.3	76.5	84.0
SA Damper Pos	64.7	72.9	74.4	73.1	84.1	44.8	72.6	73.7
PA Mass Flow	3682.	3555.	3533.	3540.	3322.	0.	3739.	3708.
Pulv DP (NOx 0.38)	13.5	15.6	12.6	15.6	25.8	0.0	10.5	17.8
Air to Fuel Ratio	2.36	2.01	2.04	2.03	1.72	0.00	2.17	2.06
Pulv Inlet Temp	305.3	322.1	321.1	310.8	355.5	81.9	315.9	357.7
Pulv Outlet Temp	150.1	151.5	150.9	151.9	150.1	87.3	151.3	150.3
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2348.	2292.	2297.	2258.	2318.	2.	2258.	2287.
Hyd Skid Pr Setpt	2124.	2358.	2325.	2309.	2400.	1149.	2279.	2387.

EndTim= 11-Nov-03 12: 13: 52 /EvalTim= 11-Nov-03 12: 13: 52 /PanRate= 0

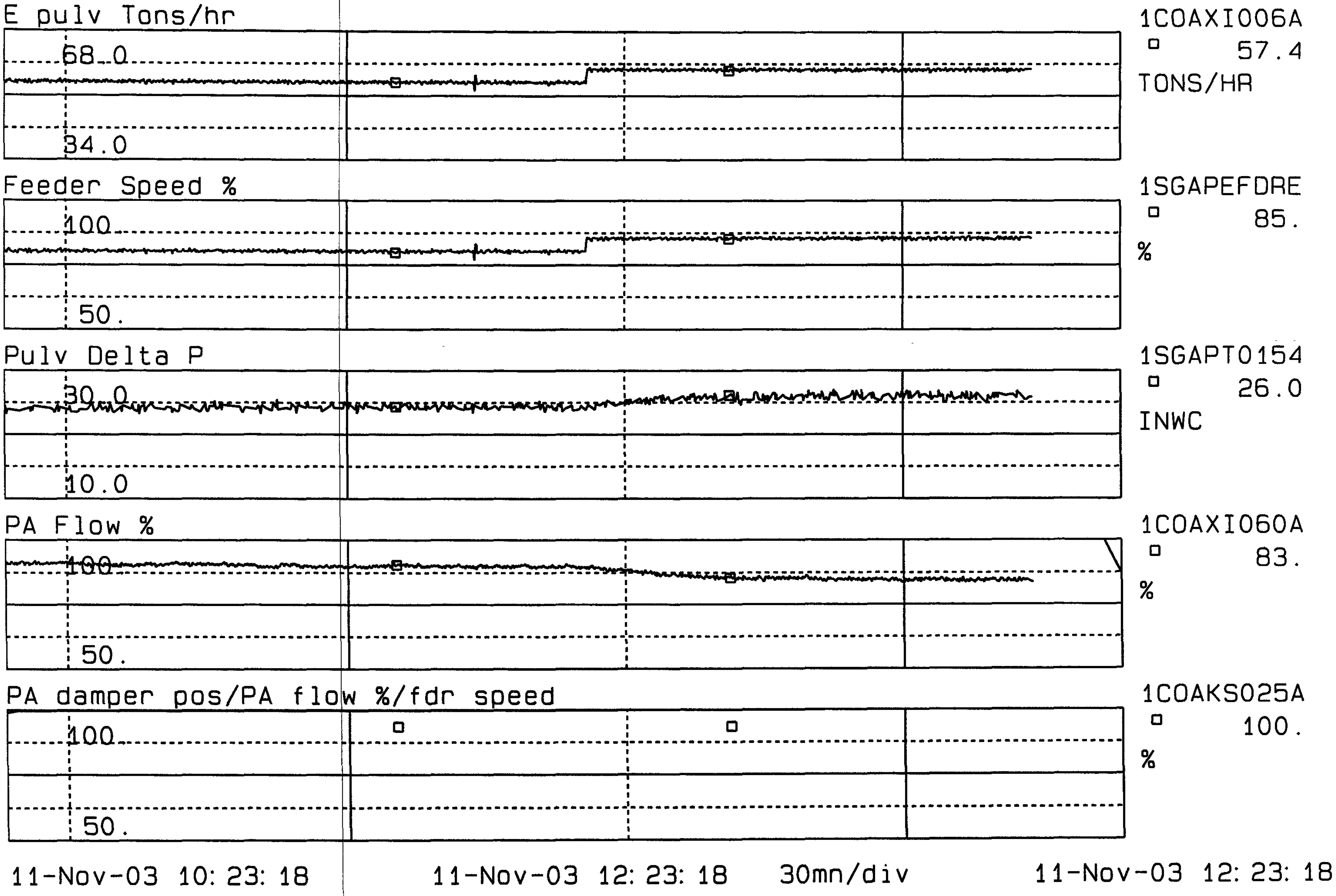
IP12_001672

Printed out for: UNIT1OP - 11-Nov-03 12:14:07

85%

0 Messages GARRY'S2 TEST PAGE

11-Nov-03 12:14:07

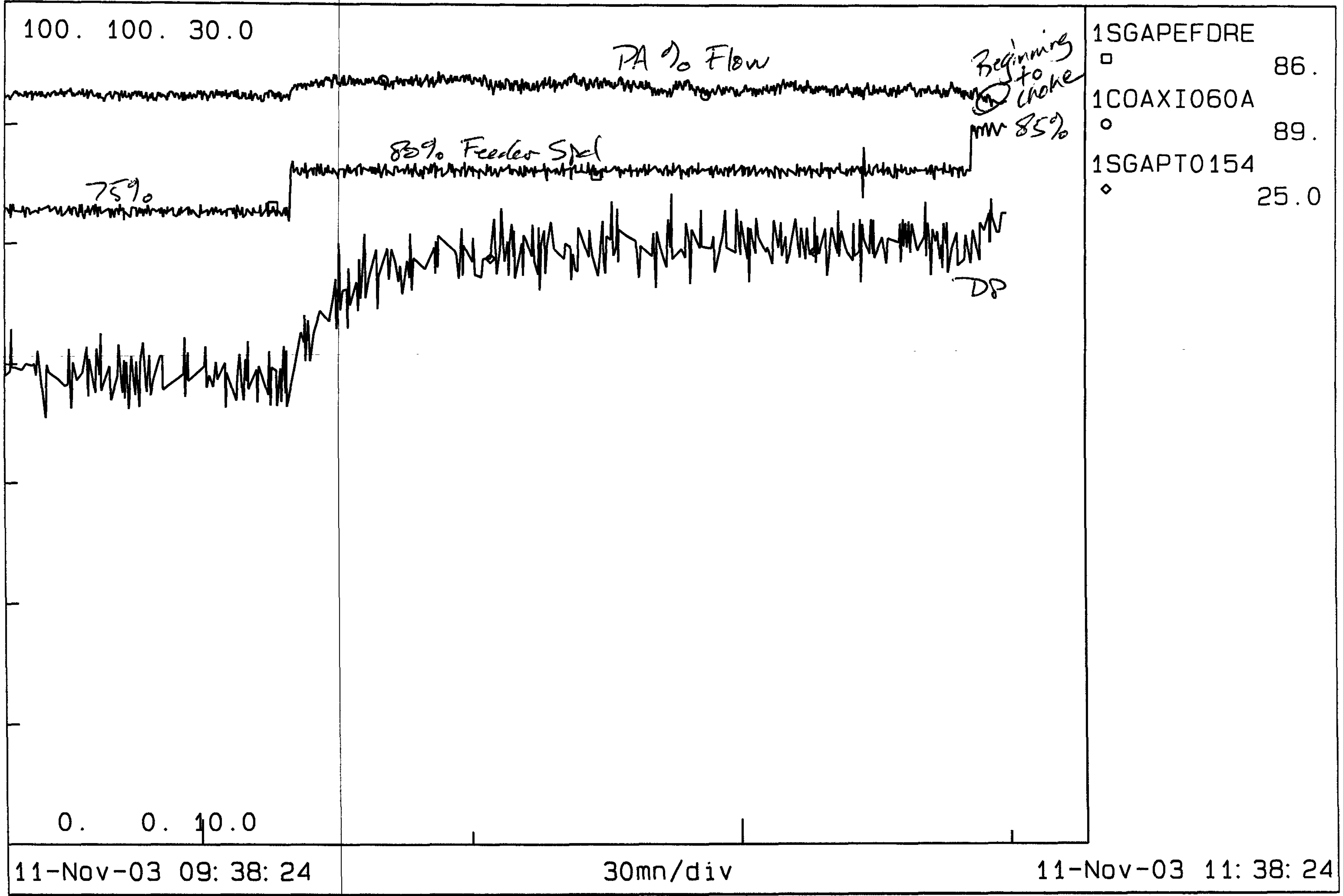


IP12_001673

Printed out for: UNIT1OP - 11-Nov-03 11:29:55

85%

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 11:29:55



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IP12_001674

Printed out for: UNIT1OP - 11-Nov-03 11:23:57 80% Fdr Spd. Stable

0 Messages U1 Pulv U1 Pulv Operating data BPR Throat 11-Nov-03 11:23:57

Unit 1 951.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow369.8TPH	47.6	53.2	51.6	53.6	55.1	0.2	52.0	54.5
Feeder Speed	71.0	79.8	77.9	78.1	80.2	0.2	77.5	78.9
Amps (Duct Pr44.2)	72.4	58.7	71.0	59.9	71.4	0.0	50.7	61.7
Coal Pipe Vel	4009.	4010.	3963.	3981.	3957.	0.	4188.	4161.
PA Flow %	91.9	90.8	89.7	90.5	90.1	0.0	94.3	94.6
PA Damper Pos	76.0	82.6	72.8	71.9	100.	1.3	81.9	84.7
SA Damper Pos	65.3	73.6	75.1	73.8	79.7	44.9	73.3	74.3
PA Mass Flow	3611.	3596.	3555.	3568.	3546.	0.	3797.	3742.
Pulv DP (NOx 0.35)	14.7	15.3	12.9	15.7	24.3	0.0	12.0	18.4
Air to Fuel Ratio	2.30	2.01	2.01	2.01	1.96	0.00	2.19	2.06
Pulv Inlet Temp	310.0	323.6	323.6	309.5	331.8	80.6	304.6	358.0
Pulv Outlet Temp	150.6	151.5	151.4	151.9	151.4	87.2	151.3	149.7
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2345.	2293.	2296.	2268.	2315.	3.	2267.	2288.
Hyd Skid Pr Setpt	2150.	2355.	2297.	2375.	2394.	1149.	2311.	2400.

EndTim= 11-Nov-03 11:23:57 /EvalTim= 11-Nov-03 11:23:57 /PanRate= 0

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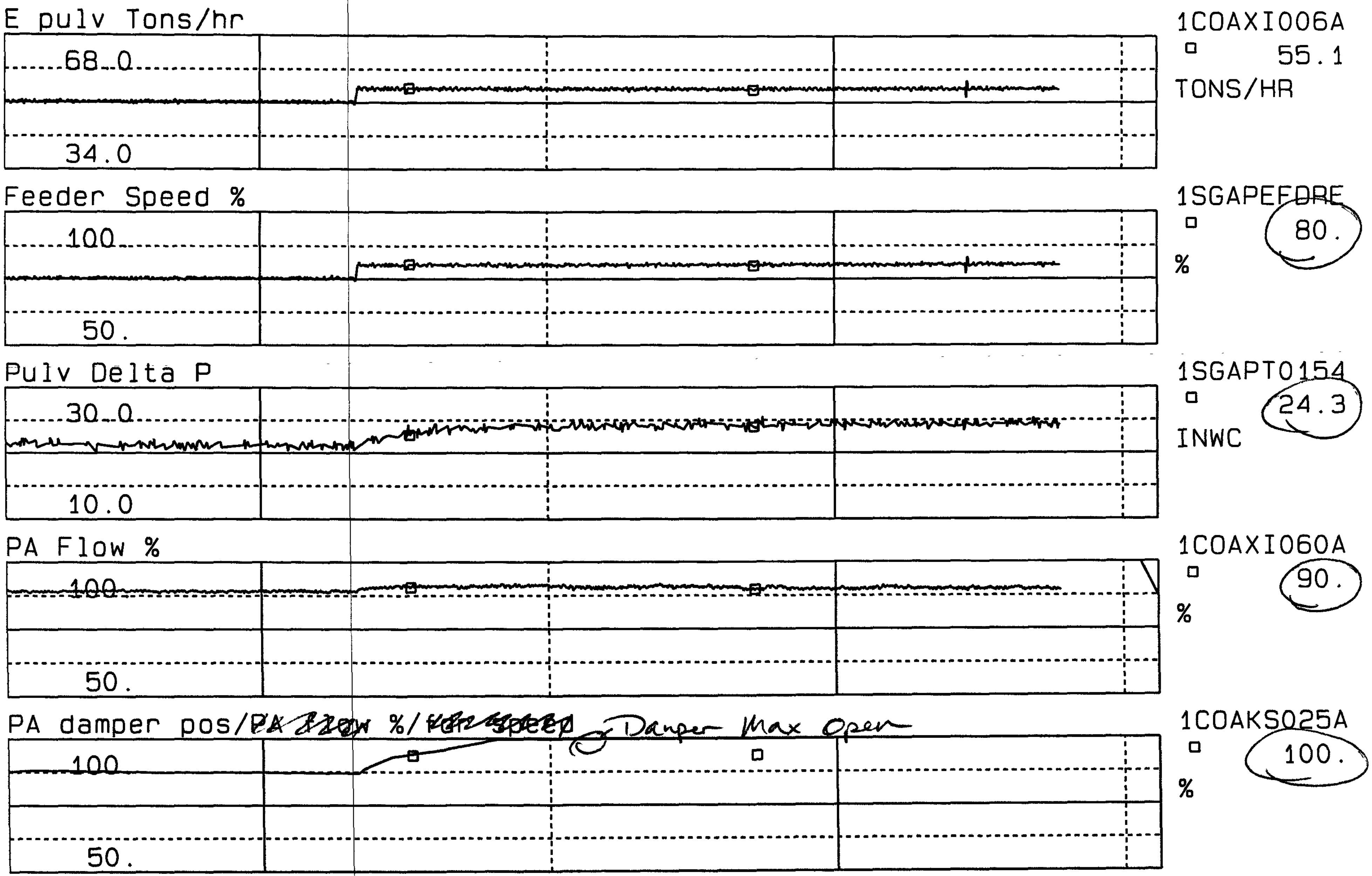
0 Messages GARRY'S2 TEST PAGE

80% Fdr Spd. Stabile

11-Nov-03 11:23:46



11-Nov-03 09:33:35 11-Nov-03 11:33:35 30mn/div 11-Nov-03 11:33:35

IP12_001676

75% 0% Bias
Stable

Printed out for: UNIT1OP - 11-Nov-03 10:09:09

0 Messages U1 Pulv U1 Pulv Operating data BPR Throats 11-Nov-03 10:09:09

Unit 1 945.5MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow369.6TPH	49.0	55.3	54.3	53.8	51.3	0.2	53.4	55.1
Feeder Speed	72.2	81.5	79.8	80.5	74.9	0.2	78.5	81.0
Amps (Duct Pr44.1)	71.9	59.5	66.7	62.4	70.5	0.0	50.4	61.9
Coal Pipe Vel	3949.	4026.	3973.	4003.	3938.	0.	4219.	4179.
PA Flow %	91.0	91.4	90.3	91.1	89.4	0.0	95.6	95.3
PA Damper Pos	76.9	82.8	73.4	72.7	86.6	1.3	79.3	86.2
SA Damper Pos	68.7	77.0	78.3	77.1	72.9	44.8	76.9	77.9
PA Mass Flow	3549.	3608.	3564.	3584.	3529.	0.	3792.	3756.
Pulv DP (NOx 0.35)	15.6	15.6	12.9	15.5	21.3	0.0	11.8	19.2
Air to Fuel Ratio	2.25	1.97	2.04	2.02	2.07	0.00	2.16	2.06
Pulv Inlet Temp	310.3	322.5	322.2	309.0	318.5	79.3	311.7	367.1
Pulv Outlet Temp	150.1	151.5	150.8	151.5	150.6	200.0	150.9	150.6
Coal Bias	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Bias	4.8	0.0	0.0	0.0	0.0	0.0	5.1	4.1
Hyd Skid Pr Fdbk	2344.	2288.	2297.	2258.	2146.	2.	2283.	2287.
Hyd Skid Pr Setpt	2203.	2400.	2396.	2393.	2262.	1149.	2363.	2400.

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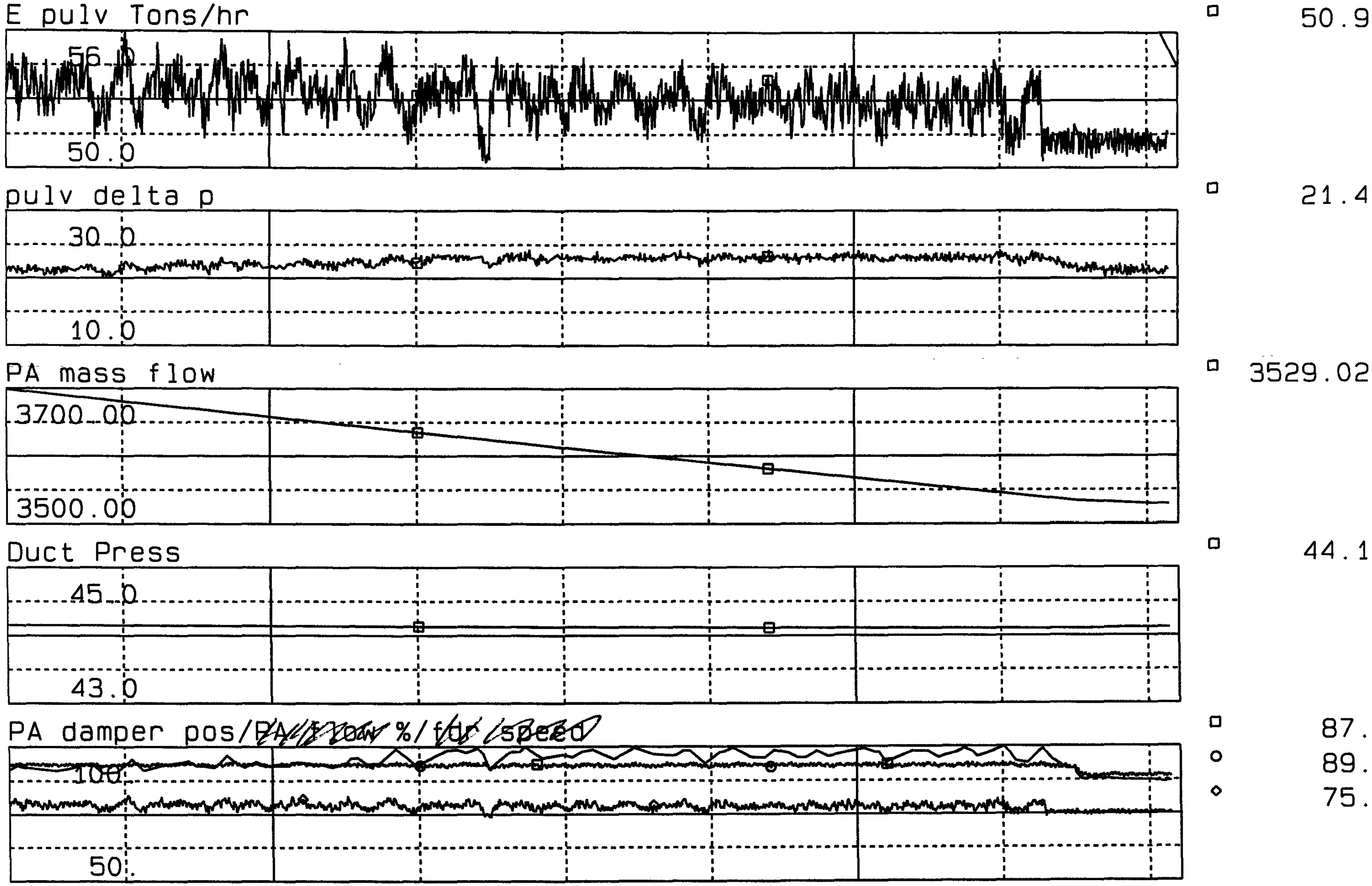
IP12_001677

Printed out for: UNIT10P - 11-Nov-03 10:08:36

0 Messages GARRY'S2 TEST PAGE

75% 0% Bias Stabile

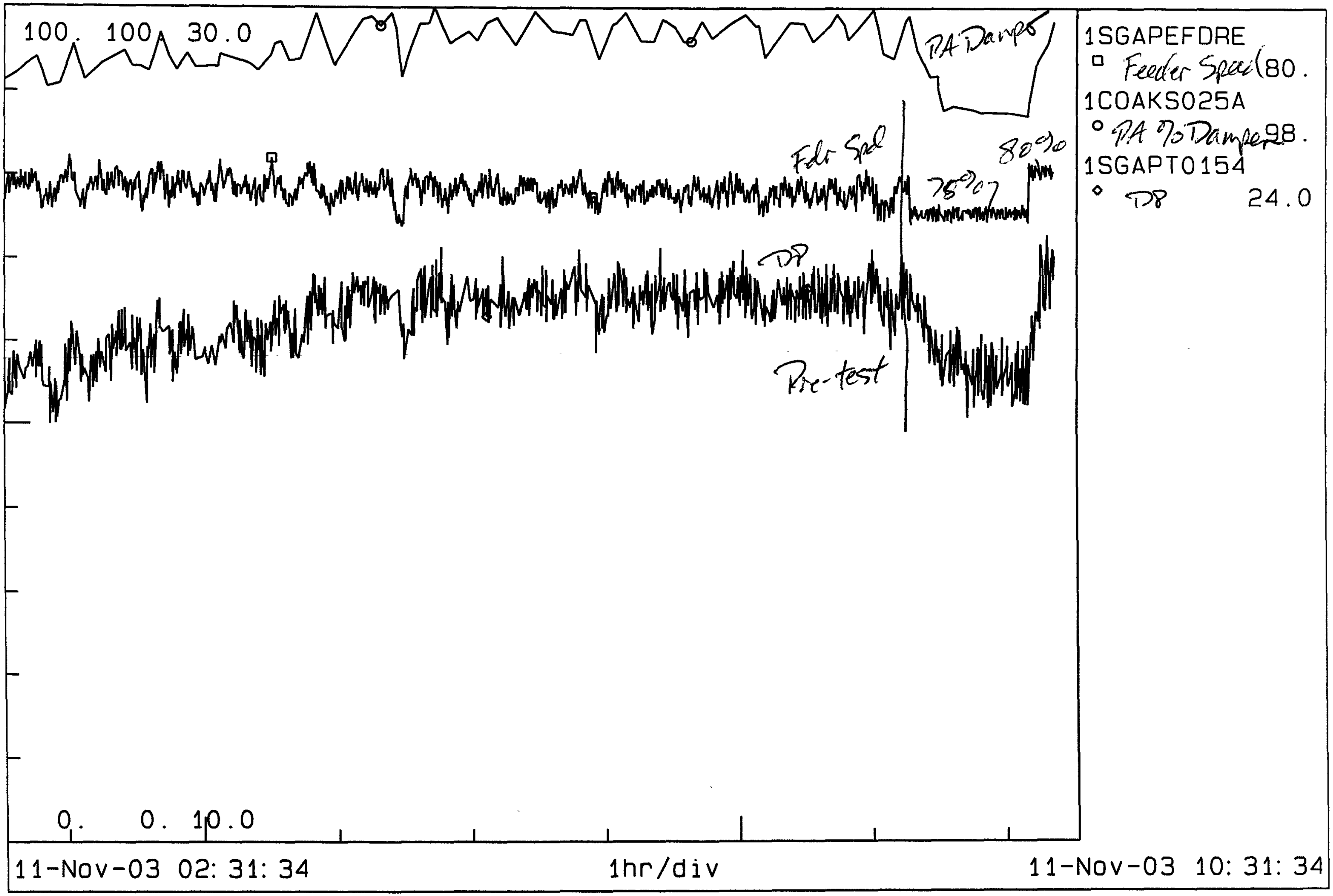
11-Nov-03 10:08:36



11-Nov-03 02:12:35 11-Nov-03 10:12:35 1hr/div 11-Nov-03 10:12:35

Printed out for: UNIT1OP - 11-Nov-03 10:21:44

0 Messages U1 Pulv U1 Pulv Operating data 11-Nov-03 10:21:44



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IP12_001679

ALSTOM

Power

Boiler and Environmental Plant Services

January 10, 2002

Intermountain Power Service Corp.
850 W. Brush Road
Delta, Utah 84624

Re: B&W Unit #1
Modification/Testing **1G Pulverizer** Rotating Throat

Attention: Mr. Phil Hailes

Dear Phil:

On Tuesday January 8, 2002, we arrived to assist in improving the performance of the **1G** pulverizer that has a new Alstom 'Rotating Throat'. The mill was open and nearly ready for trimming 1 inch off each of the horizontal wings. Once this was completed the mill was closed up and prepared for operation.

Initially after the 'Rotating Throat' was installed, the major problem was that the mill P was over 22 "W.G. when the feed rate was at 70% or about 48 tph. After the 1 inch was taken off each of the wings this value dropped to about 16 "W.G. at the 70% feed rate, however the mill still would not allow for operation above 85% feed rate. It was then decided to trim an additional ½ inch off the wings.

After the 1-1/2 inches was trimmed the mill P was reduced slightly at the 70% rate but it was virtually unchanged when the mill was brought up to 90% feeder rate. The desire by IPSC is to get the mill to operate at 95% feeder rate without 'loading up' or experiencing excessive spillage. We were still not able to operate at 95% feed rate after the second trimming.

On Thursday, we did take some data with the primary air duct pressure increased between 48" to 49 "W.G. Normally the primary air duct pressure is maintained at 44"W.G. This higher pressure allowed the mill to operate at 90% feeder rate

Technical Services

Boiler & Environmental Plant Services 22326 6th Drive SE Bothell, WA 98021 Phone: 425.487.0839 cliff.oconnell@power.alstom.com

successfully. But operating year round with this higher pressure is not possible unless the PA fans were to operate at the higher speed.

We ran the mill at 90% feed rate for over an hour, however when the feed rate was increased to 95% it only took about 10 minutes for the mill to 'load up' and choke off the airflow. We were forced to reduce the feed rate.

I left you copies of all of the data that we took and sent copies to Engineering. They will be evaluating this data. I have discussed our testing with Fred Hess and I have asked that Engineering respond back to IPSC by Monday January 14, 2002, if possible. Everyone is aware of your desire to get results and then be able to make a decision about the mill performance in the next few weeks.

If you have any questions please call or E-mail me.

Very truly yours
ALSTOM Power

Cliff O'Connell
Consulting Engineer
Technical Services

INTERMOUNTAIN POWER SERVICE CORPORATION

CONFIRMATION: (435) 864-4414 EXT. 6577

FACSIMILE: (435) 864-6670

FACSIMILE COVER SHEET

DATE: 10-4-01

TO:

COMPANY NAME: Techinomics

ATTENTION: Bruce Alfee

FACSIMILE #: 800-369-8061

FROM: Phil Hailes EXT: 6438

DEPT: Tech Services

PAGES TO FOLLOW: 3

COMMENTS: April "Oversize" Throat test.

DATE & TIME SENT:

CONFIRMATION BY:

APPROVED BY:

850 WEST BRUSHWELLMAN ROAD, DELTA, UT 84624-9546

IP12_001682

N -% Fdr Spd.

~ 72 Amps @ 95% Approx?

1C Pulverizer Oversize Throat Test.

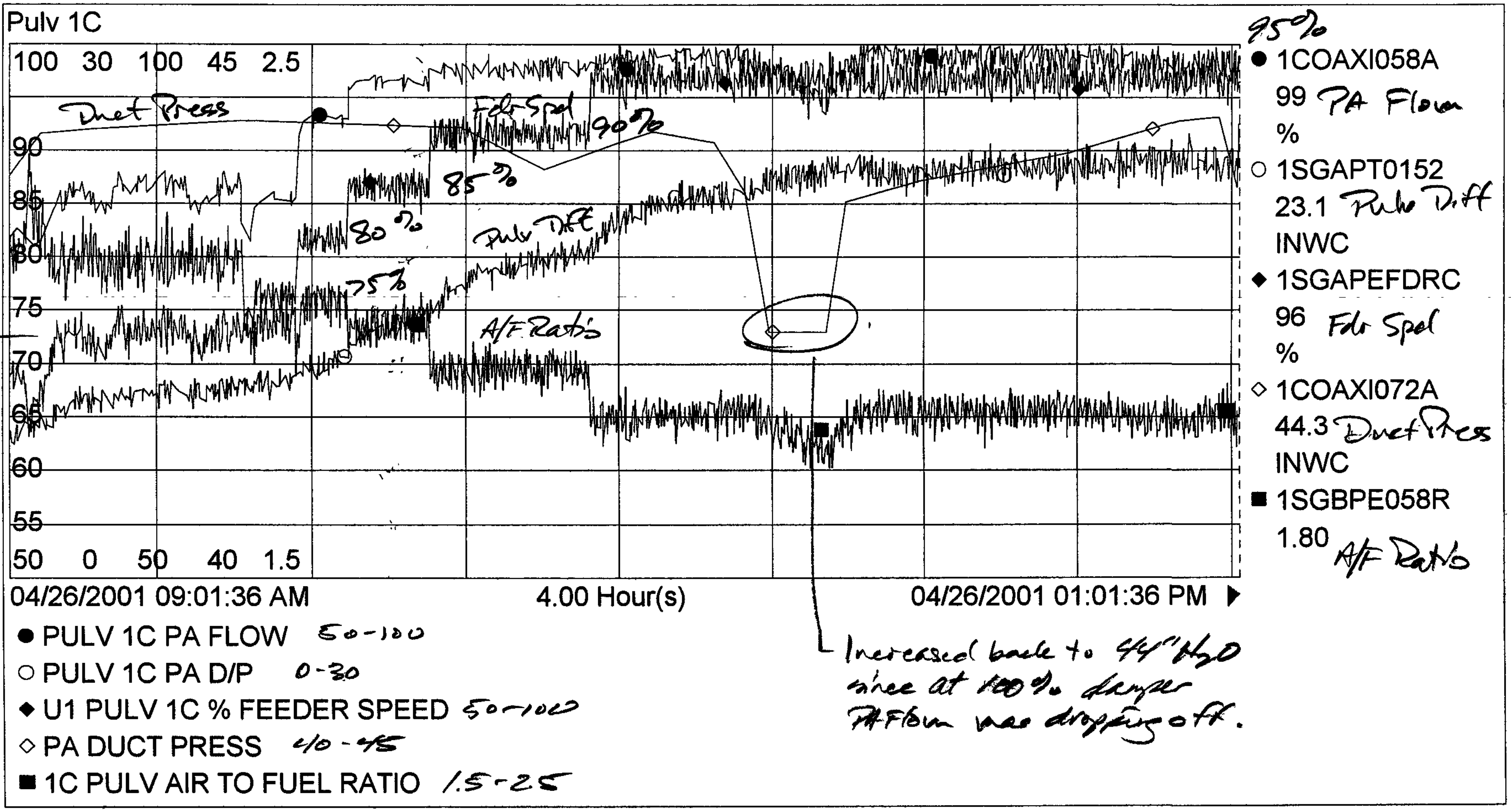
4 hr Summary

Fdr Spd. 75% to 95%

A/F Ratio 1.8

Pulv DP stable at 23" H_2O

Duct Press @ 44" H_2O



? mills on-line.

Fax 800-369-8061
Bruce Alfer

Oversize Throat Test.

95% Fdr Spd.

1C Pulverizer Oversize throat Test.

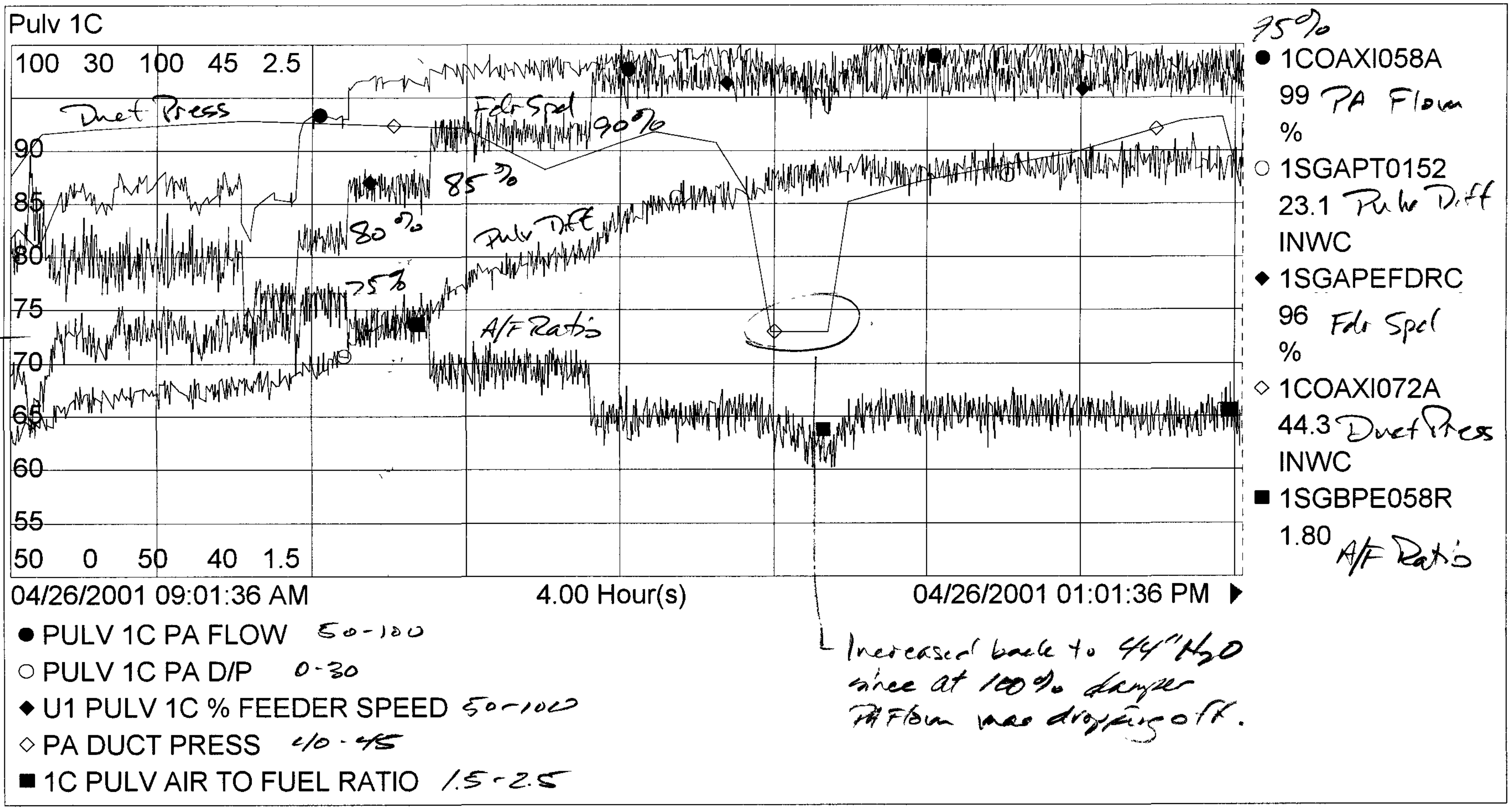
4 hr summary

Fdr Spd. 75% to 95%   A/F Ratio 1.8

Pulv DP stable at 23" H_2O

Duct Press ~ 44" H_2O

? 72 Amps @ 95% Approx ?



7 mills on-line.

IP12_001686

95% Fdr Spd.

1C Pulverizer Oversize Throat Test.

4 hr summary

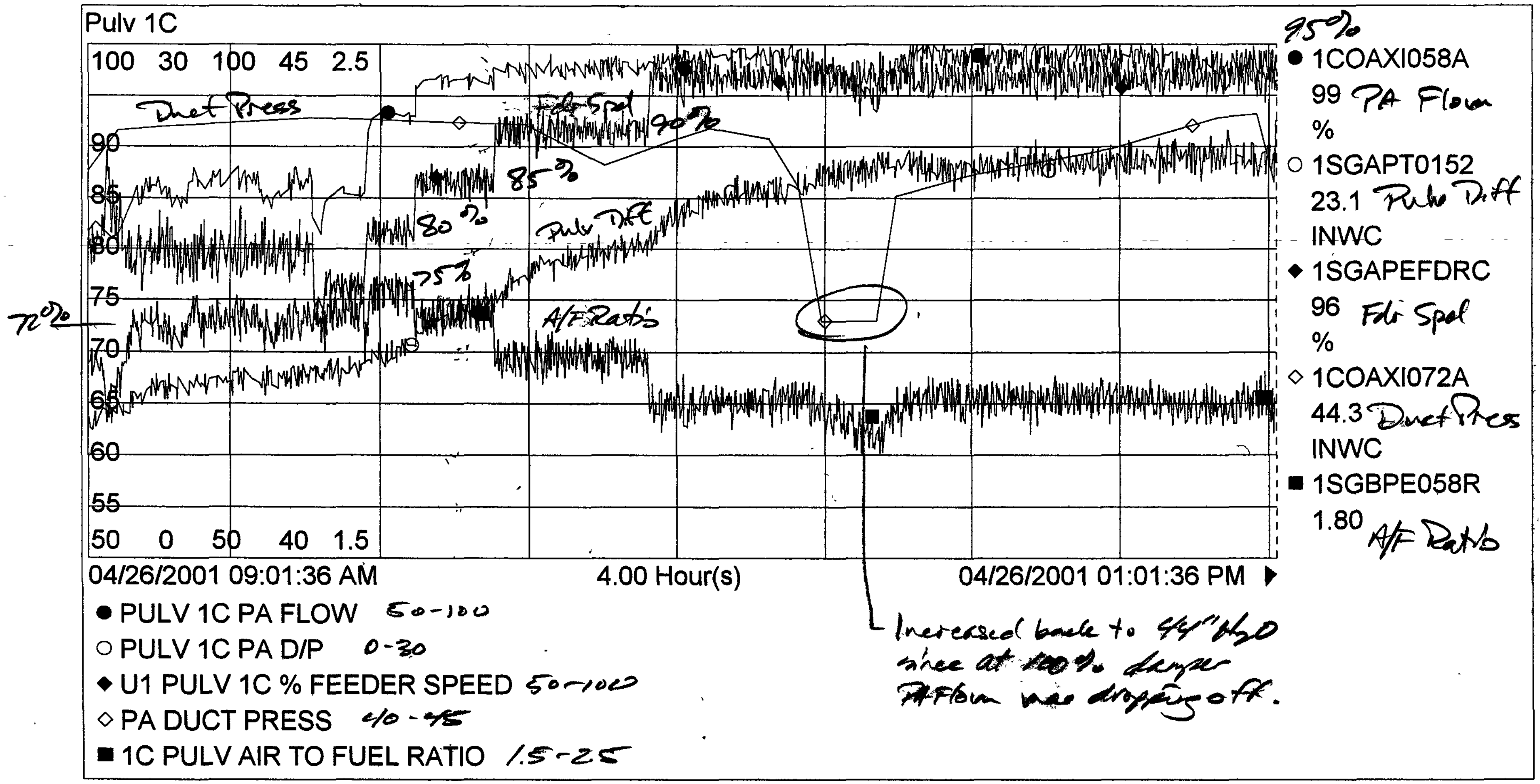
? 72 Amps @ 95% Agrees?

Fdr Spd. 75% to 95%

Pulv DP stable at 23" H_2O

Duct Press @ 44" H_2O

A/F Ratio 1.8



9 mills on-line.

IP12_001687

95% Fdr Spd.

?72 Amps @ 95% Approx?

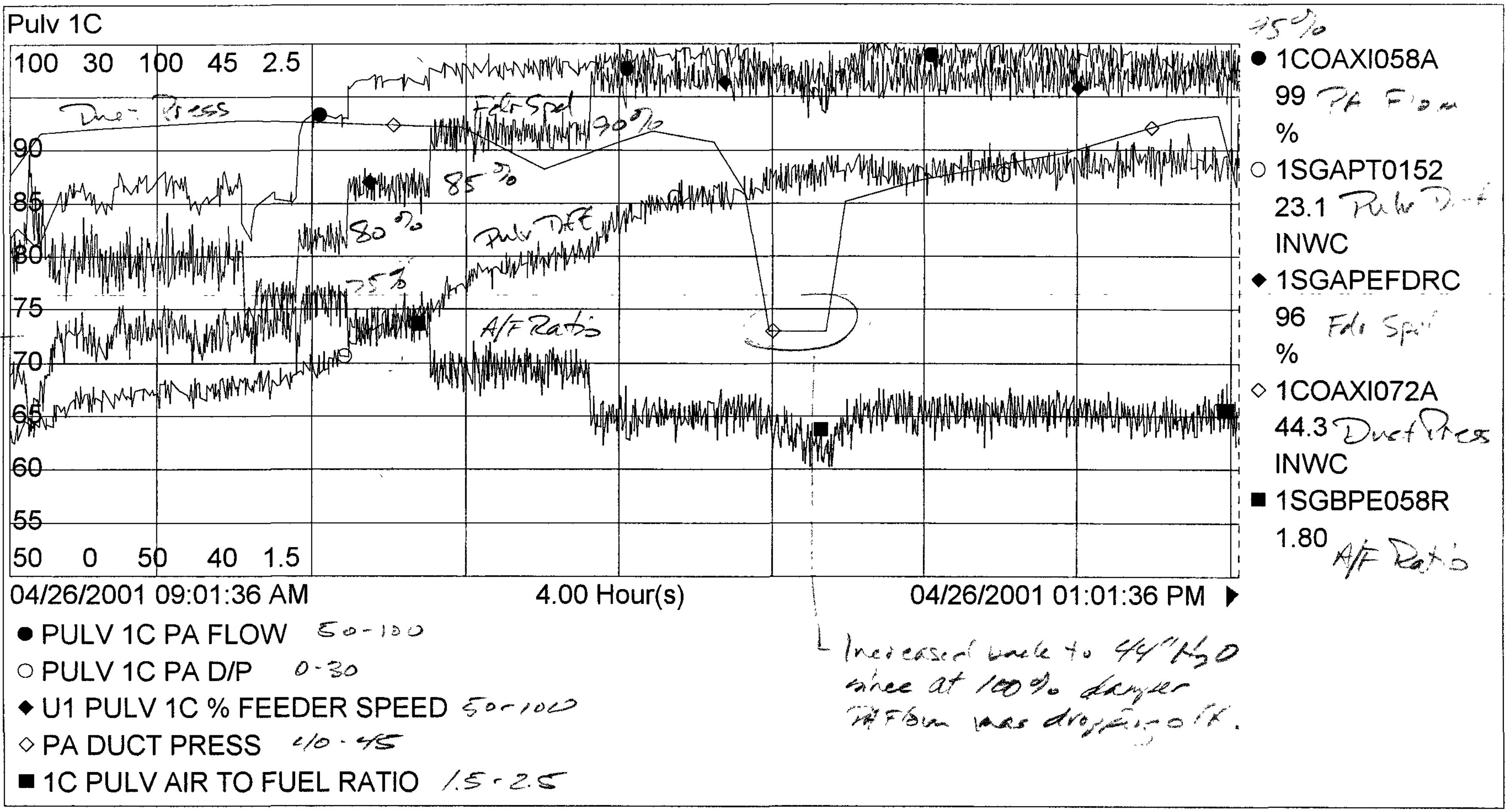
1C Pulverizer Oversize Throat Test.

4 hr Summary

Fdr Spd. 75% to 95%   A/F Ratio 1.8

Take D/P steady at 23" H_2O

Duct Press to 44" H_2O



7 mills on-line.

IP12_001688

Unit 1 C Pulverizer Test Results - Techinomics Rotating Throat - redesign installed U1 Major Spring 2001 Outage

On April 26, 2001 C Pulverizer was tested for capacity and fineness. Testing was under the direction of Phil Hailes with controls help from Bill Morgan and Ken Nielson (all from IPSC). Techinomics observers were John Lester and Robert Provost. Feed rate was increased from 75% up to 95% in 5% increments. Time was allowed between changes for the pulverizer to stabilize. Duct pressure was set at 44" until 95% feed rate was reached. It was then lowered to 42". The PA damper went to 100% (no control) at his point and the mill began to chock off. The duct pressure was then increased to 44" for the fineness test and capacity demonstration.

The fineness test was performed by Garry Christensen and Aaron Nissen from IPSC's performance group. Coal samples were taken by traversing two perpendicular axis of each coal pipe. Per the ASME test code, each coal pipe sample was weighed and found to be within the 90 to 110 percent recovery indicating a good sample. A raw coal sample was taken during the fineness test at the feeder coal inlet gate. This was taken to IPSC coal lab for analysis as well as the sample from the coal pipes. The times for the fineness test and data reported on the fineness results were 12:50 to 14:15 on April 26, 2001. The results of the fineness showed 73% through 200 mesh (guarantee 75%) with the pulverizer averaged 71.5 amps (guarantee 62 amps) during the test. The full results are found on the following test results page. The pulverizer was run at the 95% for over 3½ hours with a pyrite sample also taken to identify the amount of coal to rock. This sample was given to Techinomics to perform a detailed pyrites analysis.

Note: This pulverizer (U1 C) is being ran by operations with a 6 to 10% primary air bias plus an occasional feeder bias due to problems with pyrites loading up with large amounts of rock. The pyrites removal system needs to be modified to allow handling of the increased pyrites of this rotating throat design.

Intermountain Generating Station
Pulverizer Fineness Results

Test#	1	2	3	4	5	6
Date Tested	12/2/99	4/26/01				
Unit	1	1	1	1	1	1
Mill	C	C	C	C	C	C
% Feeder Speed	80	95	95			
Actual % Through 200 Mesh	75.10	73.10				
Expected % Through 200 Mesh	60.02	64.33	#VALUE!			
HGI	41.8	46.1				
Total Moisture	5.60	9.99				
Air Dry Loss	4.30	8.16				
As Received Btu	12,636	11,537				

Test Period Average Data

Test	1	2	3	4	5	6
Unit Pulv	1/C	1/C	1/C	1/C	1/C	1/C
% Feeder Speed	79.79	96.70				
Actual Pulv Coal Flow (tph)	54.28	65.77				
Pulv Air to Fuel Ratio	2.03	1.78				
Hydraulic Skid Press FeedBack (psi)	2202	2419				
Hydraulic Skid Press Set Pt (psi)	2390	2398				
Skid Mode		auto/master				
Local Skid Press (psi)		2400				
PA Damper Position (%)	81.89	98.69				
PA Flow (%)	92.86	97.21				
PA Inlet Damper Temp (DEGF)	343.83	365.32				
PA D/P (INWC)	21.95	23.69				
Disch Temp (DEGF)	150.10	150.77				
Pulv Motor (amps)	64.63	71.54				
Pulv Pitot Tube DP (INWC)	3.26	3.56				
PA Mass Flowrate (lb/min)	3664	3904				
Pulv hrs since 30K Overhaul	396	8875				
Pulv amp swing	7.09	6.47				
PA Duct Pressure (INWC)	43.81	44.14				

Test	1	2	3	4	5	6
Mill	C	C	C	C	C	C
* Contract % Through 200 Mesh @ 95% fdr speed	70	70	70	70	70	70
HGI Correction	0.836	0.921	#VALUE!			
Moisture Correction	0.997	0.958	#VALUE!			
Fineness Correction	1.152	1.087	#VALUE!			
Expected % Through 200 Mesh (Good @ 65 tph only)	60.02	64.33	#VALUE!			
Actual % Through 200 Mesh	75.10	73.10				
Difference	15.08	8.77	#VALUE!			
Ratio	125.13	113.63	#VALUE!			
% Retained on 30 & 50 Mesh	0.10	0.03				
Actual % Through 50 Mesh	99.90	99.70				
Actual % Through 100 Mesh	97.60	96.90				

*Contract coal - 48 HGI and air dry loss < 4%.
Expected is found from fineness correction vs % through 200 mesh graph.

	Test 1	Test 2	Test 3	D PULV	E PULV	F PULV
Fineness Correction	1.151781	1.087353	#VALUE!			
Expected	60.02	64.33	#VALUE!			

IP12_001690

Techonomics Rotating Throats
Guaranteed Parameters

The following performance and maintenance parameters are the minimum guaranteed parameters defining acceptance or rejection of the Techonomics throats to be installed at the Intermountain Generating Station. The determination of acceptance or rejection will be made by Intermountain Power Service Corporation based on the testing and historical baseline data that IPSC determines to be most reliable and consistent. Any performance improvements specified in the following list shall be calculated as the difference between the existing B&W rotating throat performance and the Techonomics rotating throat performance.

1. Minimum guaranteed fineness.. 75%
(% passing 200 mesh corrected for moisture and HGI)

2. Maximum guaranteed drive system amperage at 95% feeder speed......................... 62 amps
(under normal operating conditions)

3. Mill shall provide stable operation at full rated capacity (65 tph) regardless of rock content in fuel: Stable is defined as a maximum dp of 21", no coal bias, no air bias, no duct pressure bias.

4. Mill shall experience no measurable erosion in mill areas above the roll wheels.

5. Techonomics rotating throat life shall wear at one-half or less of the rate of the B&W rotating throats.

6. Mill shall not exceed 2" higher differential than the lowest running B&W rotating throat at any mill capacity.

7. Mill rejects shall consist of at least 70% noncombustibles.
(Visual inspection is not adequate to accurately determine actual pyrite content. Pyrite samples shall be washed and lab inspected.)

8. NOx emissions shall not increase as a result of Techonomic throat installation.

9. Any throat components breaking or cracking under typical operating circumstances shall be replaced by Techonomics at no cost to IPSC for materials.

10. Mill will be operated at a maximum ~~fuel to air~~ air-to-fuel ratio of 2:1 throughout the testing period.

11. Techonomics rotating throats shall not impede the removal of the gearbox and drive assembly beyond what is typically required with stationary throats.

12. Tests shall be run with a hydraulic loading skid discharge pressure of 2100 psi.

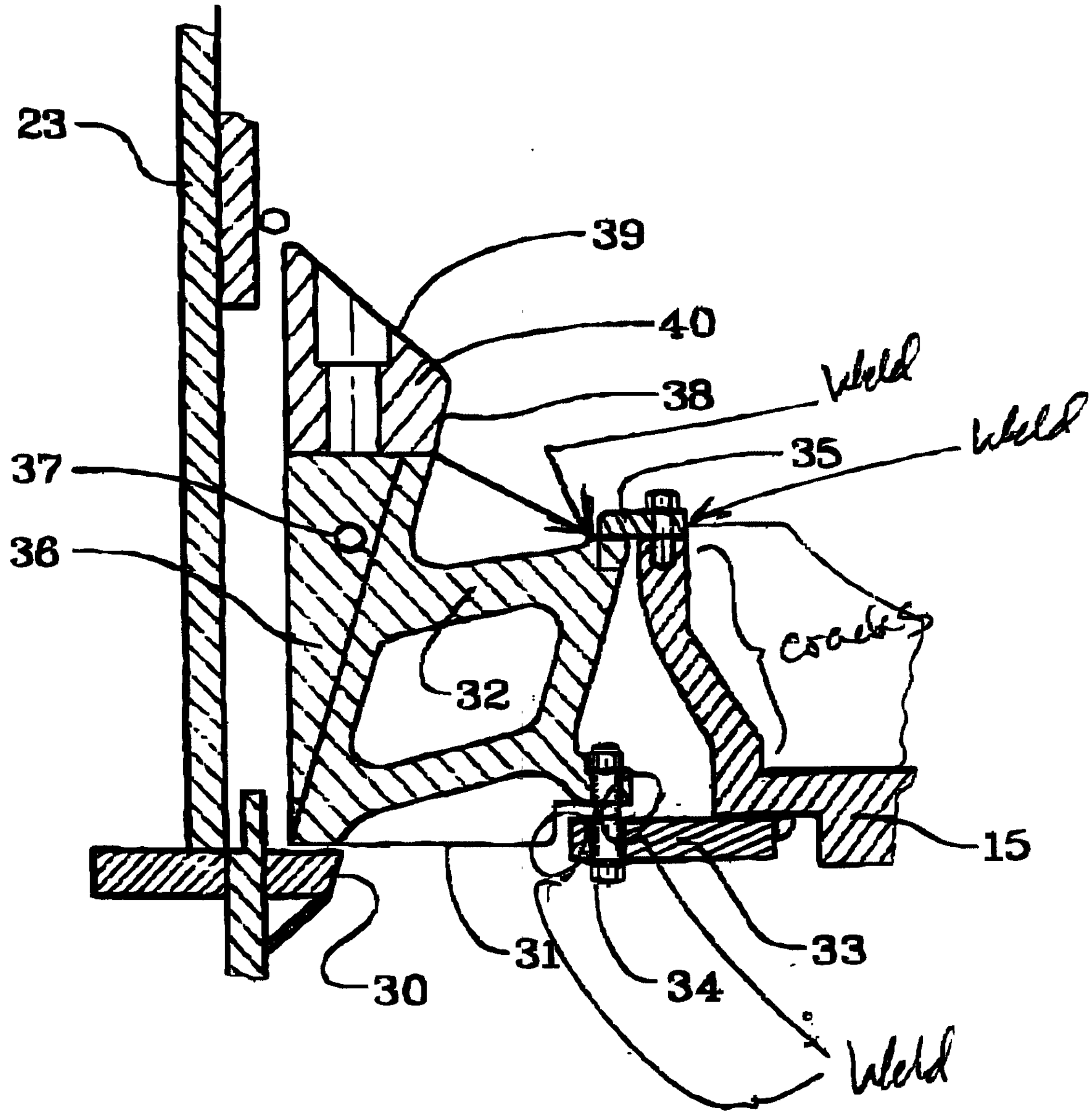


Fig. 2a

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: George W. Cross

FROM: Dennis Killian

DATE: April 25, 2001

Subject: Unit 1 C Pulverizer Rotating Throat Performance Test

Date of Test:	Thursday, April 26, 2001
IPSC Personnel:	Phil Hailes, Garry Christensen and Ken Nielsen
Techinomics Personnel:	Bob Provost and John Lester

Tech Services requests permission to perform a performance related test on Unit 1 C pulverizer. This test is to confirm the capabilities of the new "oversize" rotating throats which were installed during the most recent outage.

PA Duct ? Press. 42-44

This test is expected to include running the mill with 70% to 95% coal feeder speed. This feeder speed will be incremented up at 5% steps, from 70% to 95% Other setting changes may include PA Damper position, air and coal bias and hydraulic skid pressure.

Parameters and variables that are likely to be observed via PI during the test, include pulv DP, PA mass flow, amps, coal flow, rate of pyrite rejection at the mill, etc.

This test is planned for Thursday, April 26, 2001.

Those involved in the test include, Phil Hailes, Garry Christensen and Ken Nielsen of IPSC. The throat supplier, Techinomics, will have two representatives on site during the test. They are Bob Provost and John Lester.

Contact Phil Hailes at ext.6438 with any questions.

Intermountain Generating Station
Pulverizer Fineness Results

		skid auto	skid auto	skid auto	skid auto
Test#					
Date Tested		05/26/2000	05/25/2000	05/26/2000	05/25/2000
Unit	1	2	1	2	1
Mill	A	B	C	D	E
% Feeder Speed		70.00	70.00	70.00	70.00
Actual % Through 200 Mesh		73.99	76.61	77.21	75.45
Expected % Through 200 Mesh		64.51	62.63	64.51	62.63
HGI		44.5	43.5	45	44
Total Moisture		6.25	6.69	6.25	6.69
Air Dry Loss		4.56	4.85	4.56	4.85
As Received Btu		12,290	12,150	12,290	12,150

Test Period Average Data						
Test		2	3			
Unit Pulv	2/A	2/B	1/C	2/D	1/E	
% Feeder Speed		70.96	69.40	70.29	69.70	
Actual Pulv Coal Flow (tph)		47.02	47.18	47.75	47.39	
PA Damper Position (%)		65.68	67.22	66.68	78.96	
PA Flow (%)		87.40	78.08	78.85	86.88	
PA Inlet Damper Temp (DEGF)		295.04	357.37	324.28	304.15	
PA D/P (INWC)		9.43	15.15	14.00	16.95	
Disch Temp (DEGF)		152.31	151.89	150.55	151.46	
Pulv Motor (amps)		58.57	60.10	56.89	61.50	
Pulv Pitot Tube DP (INWC)		3454	3114	3115	3326	
PA Mass Flowrate (lb/min)		3413	2957	3073	3267	
Pulv hrs since 30K Overhaul		313	3671	2548	14961	did not get reset
Pulv H amp swing		12.56	6.56	7.59	8.02	
PA Duct Pressure (INWC)		43.43	43.11	43.47	43.52	
Hydraulic Skid Press FeedBack		1918	2280	1977	2082	
Hydraulic Skid Press Set Pt		2173	2135	2156	2125	

Test		2400 psi	Locked		
Mill	A	B	C	D	E
* Contract % Through 200 Mesh	70	70	70	70	70
HGI Correction		0.890	0.870	0.890	0.870
Moisture Correction		0.994	0.992	0.994	0.992
Fineness Correction		1.085	1.113	1.085	1.113
Expected % Through 200 Mesh (Good @ 65 tph only)		64.51	62.63	64.51	62.63
Actual % Through 200 Mesh		73.99	76.61	77.21	75.45
Difference		9.48	13.98	12.70	12.82
Ratio		114.70	122.32	119.69	120.47
% Retained on 30 & 50 Mesh		0.06	0.05	0.02	0.07
Actual % Through 50 Mesh		99.57	99.56	99.58	99.59
Actual % Through 100 Mesh		96.37	98.18	98.34	97.10

* Contract coal - 48 HGI and air dry loss < 4%.
Expected is found from fineness correction vs % through 200 mesh graph.

	A PULV	B PULV	C PULV	D PULV	E PULV
Fineness Correction		1.084726	1.112908	1.084726	1.112908
Expected	#VALUE!	64.51	62.63	64.51	62.63

Note: 1C + 2D @ lower PA Flow

IP12_001694

Intermountain Generating Station
Pulverizer Fineness Results

					skid auto
Test#					
Date Tested					05/25/2000
Unit	1	2	1	2	1
Mill	A	B	C	D	E
% Feeder Speed					95.00
Actual % Through 200 Mesh					70.60
Expected % Through 200 Mesh					62.63
HGI					44
Total Moisture					6.69
Air Dry Loss					4.85
As Received Btu					12,150

Test Period Average Data					
Test		2	3		
Unit Pulv	2/A	2/B	1/C	2/D	1/E
% Feeder Speed					94.51
Actual Pulv Coal Flow (tph)					64.28
PA Damper Position (%)					99.45
PA Flow (%)					91.86
PA Inlet Damper Temp (DEGF)					355.73
PA D/P (INWC)					25.48
Disch Temp (DEGF)					151.25
Pulv Motor (amps)					66.91
Pulv Pitot Tube DP (INWC)					3519.48
PA Mass Flowrate (lb/min)					3469.61
Pulv hrs since 30K Overhaul					14962.45 did not get reset
Pulv H amp swing					7.99
PA Duct Pressure (INWC)					45.31
Hydraulic Skid Press FeedBack					2235
Hydraulic Skid Press Set Pt					2400

Test					
Mill	A	B	C	D	E
* Contract % Through 200 Mesh					95
HGI Correction					0.870
Moisture Correction					0.992
Fineness Correction					1.113
Expected % Through 200 Mesh (Good @ 65 tph only)					62.63
Actual % Through 200 Mesh					70.60
Difference					7.97
Ratio					112.72
% Retained on 30 & 50 Mesh					0.04
Actual % Through 50 Mesh					99.50
Actual % Through 100 Mesh					96.32

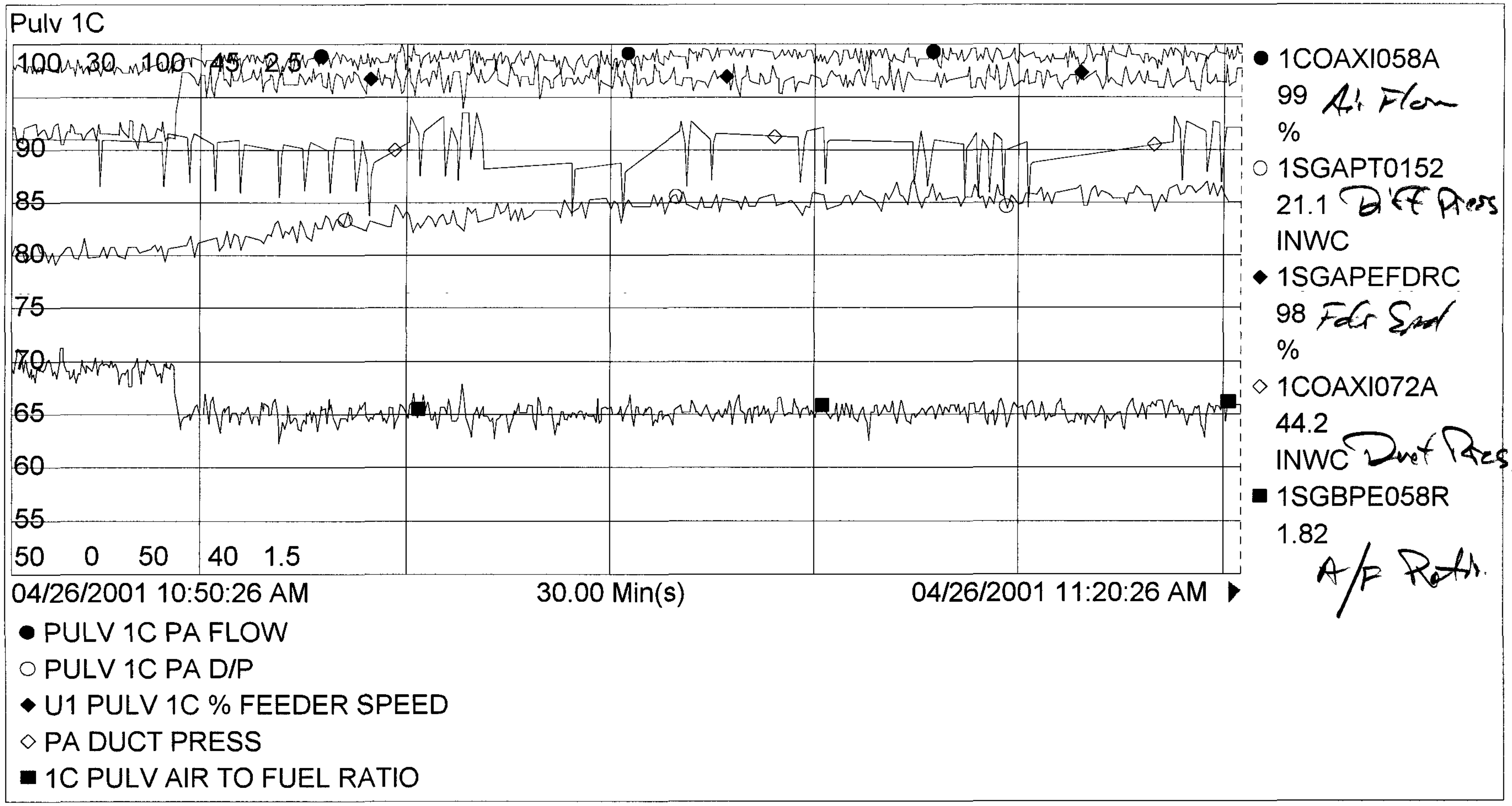
* Contract coal - 48 HGI and air dry loss < 4%.
Expected is found from fineness correction vs % through 200 mesh graph.

	A PULV	B PULV	C PULV	D PULV	E PULV
Fineness Correction	0.000000	0.000000	0.000000	0.000000	1.112908
Expected	164.88	164.88	164.88	164.88	62.63

IP12_001695

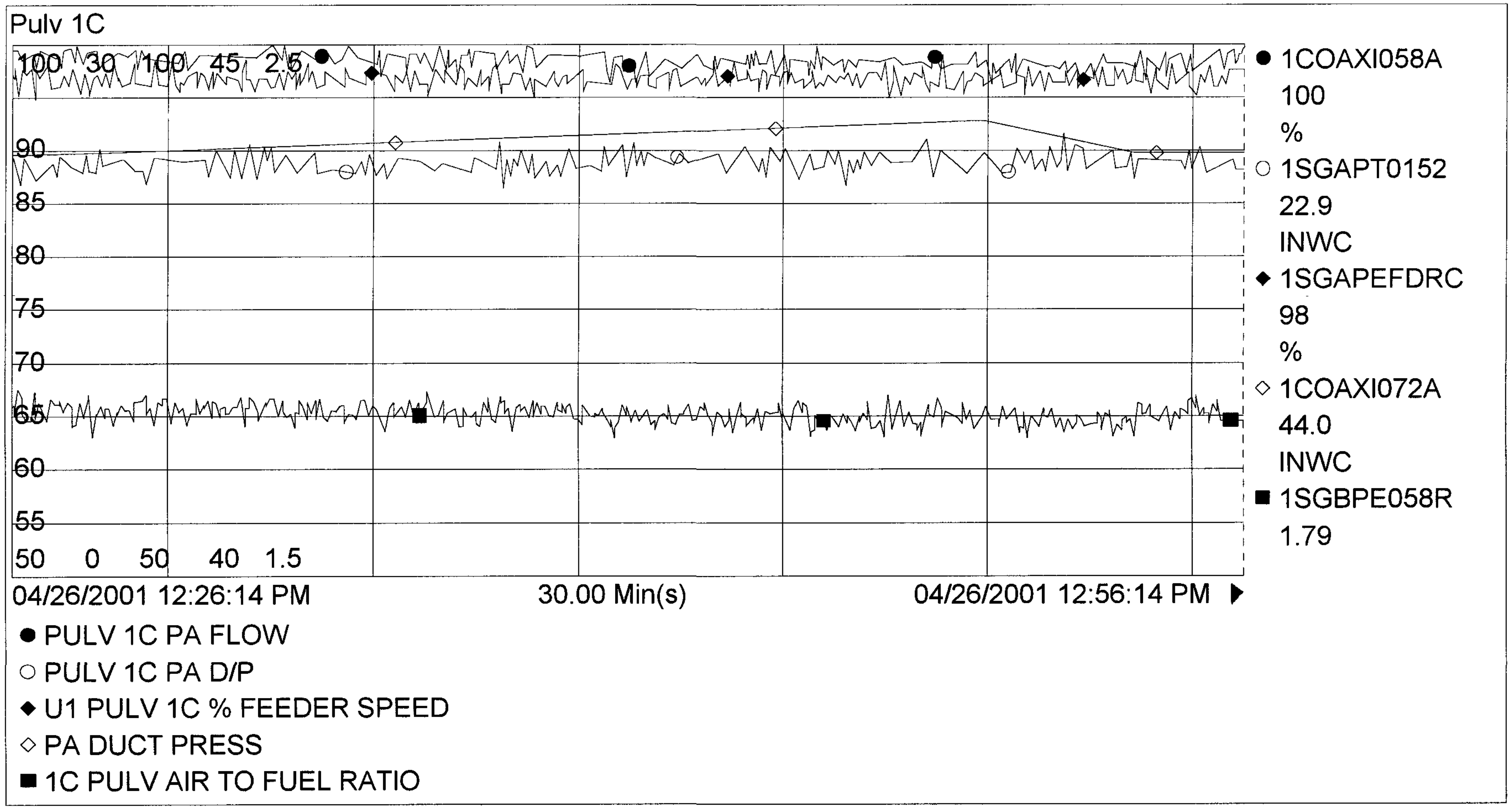
Unit 2 Pulv	Test 1	Test 2	Test 3
	D	D	D
% Feeder Speed	96.0	93.9	No good data for this point for this time:
Actual Pulv Coal Flow (tph)	65.3	63.9	No good data for this point for this time:
PA Damper Position (%)	91.1	86.8	No good data for this point for this time:
PA Flow (%)	98.1	98.8	No good data for this point for this time:
PA Inlet Damper Temp (DEGF)	376.0	379.4	No good data for this point for this time:
Pulv PA air temp comp (Deg F)	379.5	377.2	No good data for this point for this time:
PA D/P (INWC)	22.3	20.2	No good data for this point for this time:
Disch Temp (DEGF)	151.2	149.2	No good data for this point for this time:
Pulv Motor (amps)	64.3	64.3	No good data for this point for this time:
Pulv C amp swing	8.6	8.0	No good data for this point for this time:
Hydraulic Skid Press FeedBack	2378	2147	
Hydraulic Skid Press Set Pt	2400	2400	
Skid Mode	auto/master	auto/master	
Local Read	2400		
PULV 1D, 30K OVRHAUL HOURS	106	890	No good data for this point for this time:
Pulv Air to Fuel Ratio	1.79	1.82	No good data for this point for this time:
Pulv Pitot Tube DP (INWC)	4.00	4.01	No good data for this point for this time:
PA Mass Flowrate (lb/min)	3892	3881	No good data for this point for this time:
Coal Pipe Velocity (ft/min)	4352		
Pulv Temp air flow	1386	1354	No good data for this point for this time:
Pulv Air Bias	0.0	0.0	No good data for this point for this time:
Pulv Coal Bias	0.0	0.0	No good data for this point for this time:
Barometric Pressure (inhg)	25.59	25.23	No good data for this point for this time:
Pri Air Duct Pressure (inwc)	45.19	44.71	No good data for this point for this time:

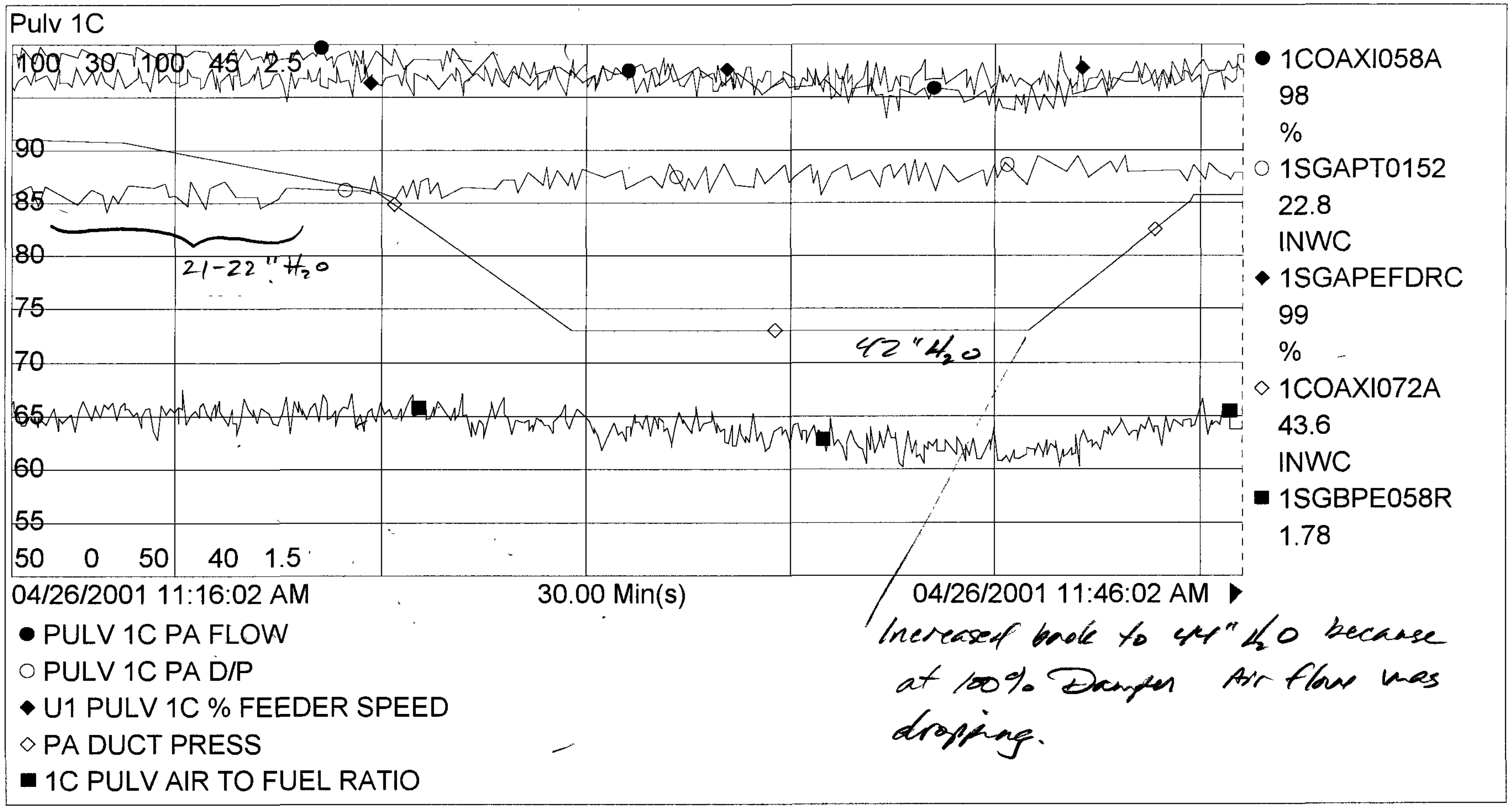
95% Feeder Spd.
4"H_2O Duct Press
0 Bias Air Coal
1.8 A/F Ratio's.



IP12_001697

95% Fdr Spd.
44" H_2O Duct Press.

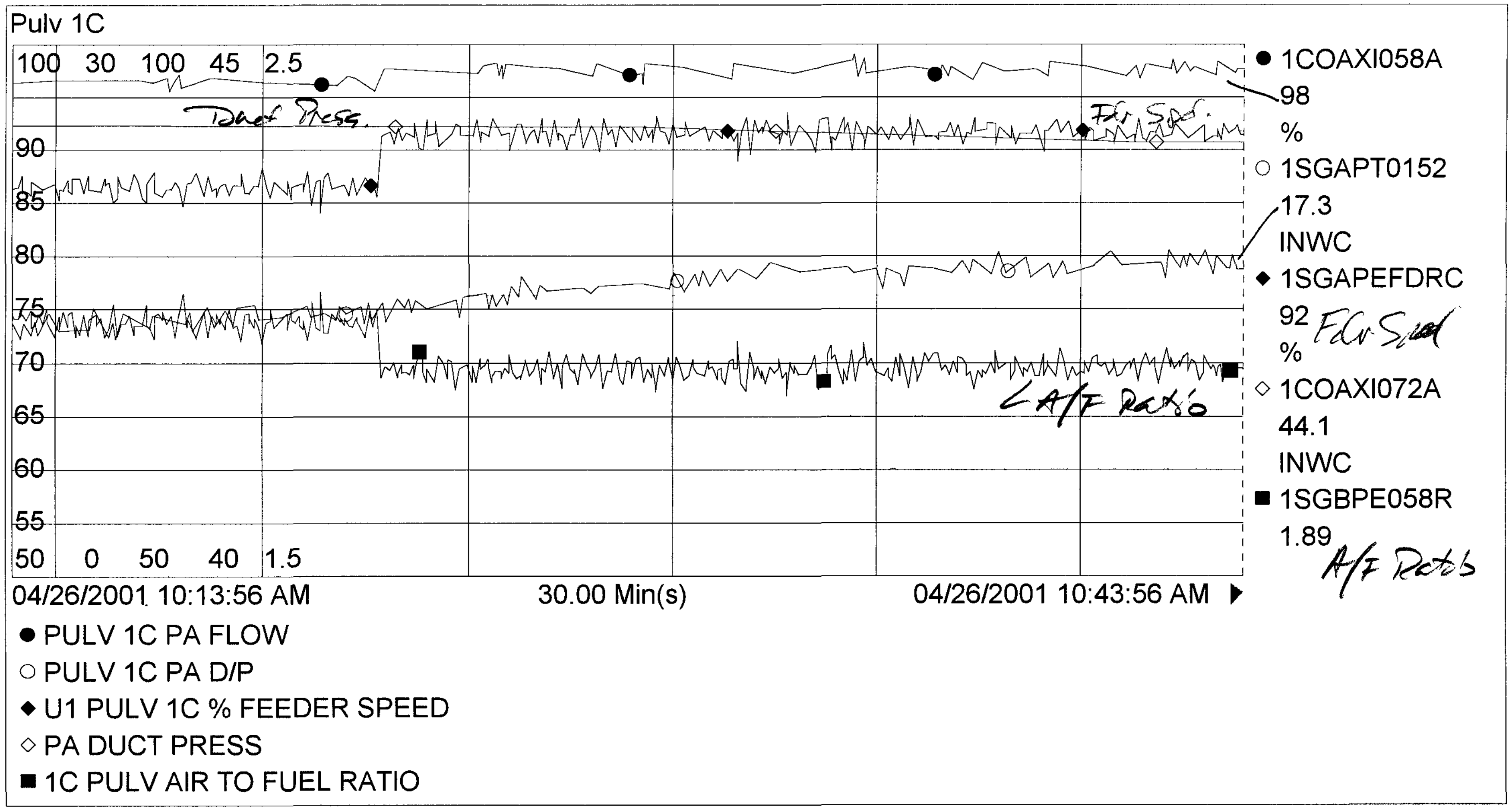




412-889-2040 Bob Cell.

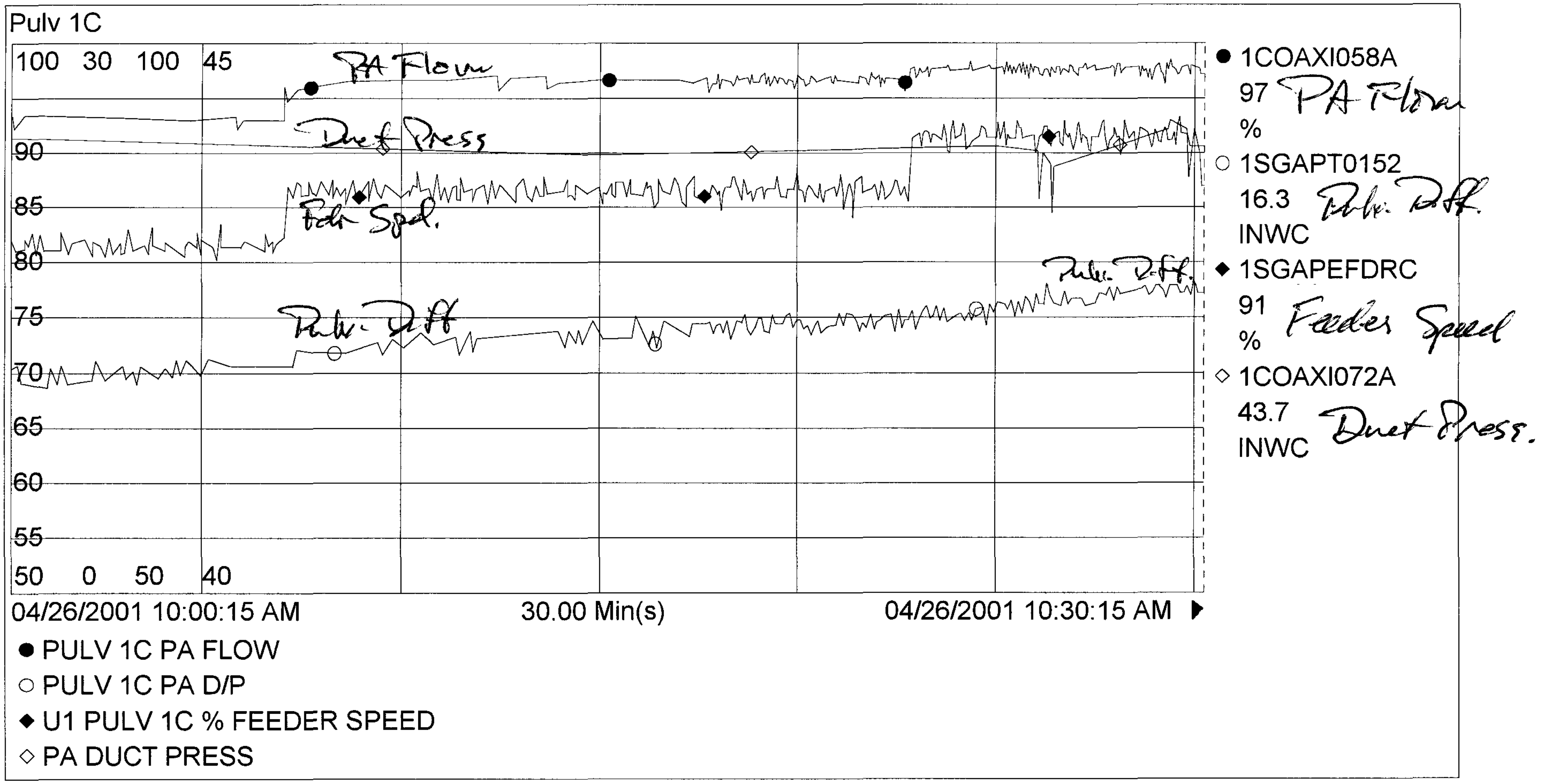
IP12_001699

90% Feeder Speed



IP12_001700

1C Pulverizer Throat Test.



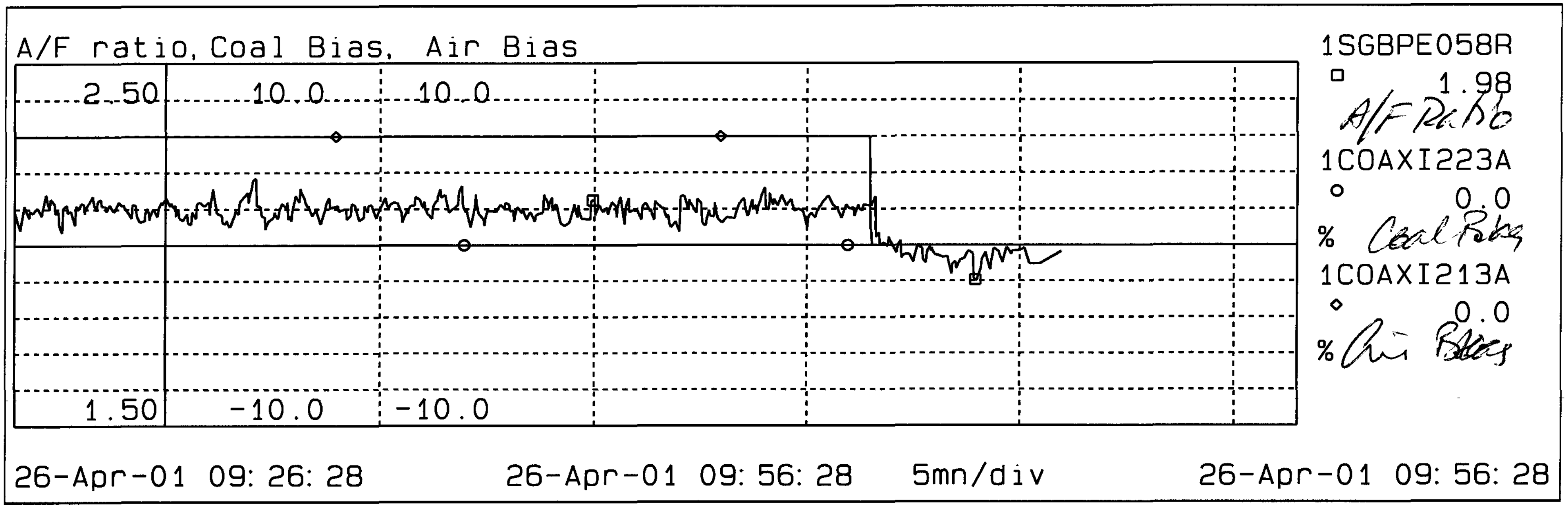
IP12_001701

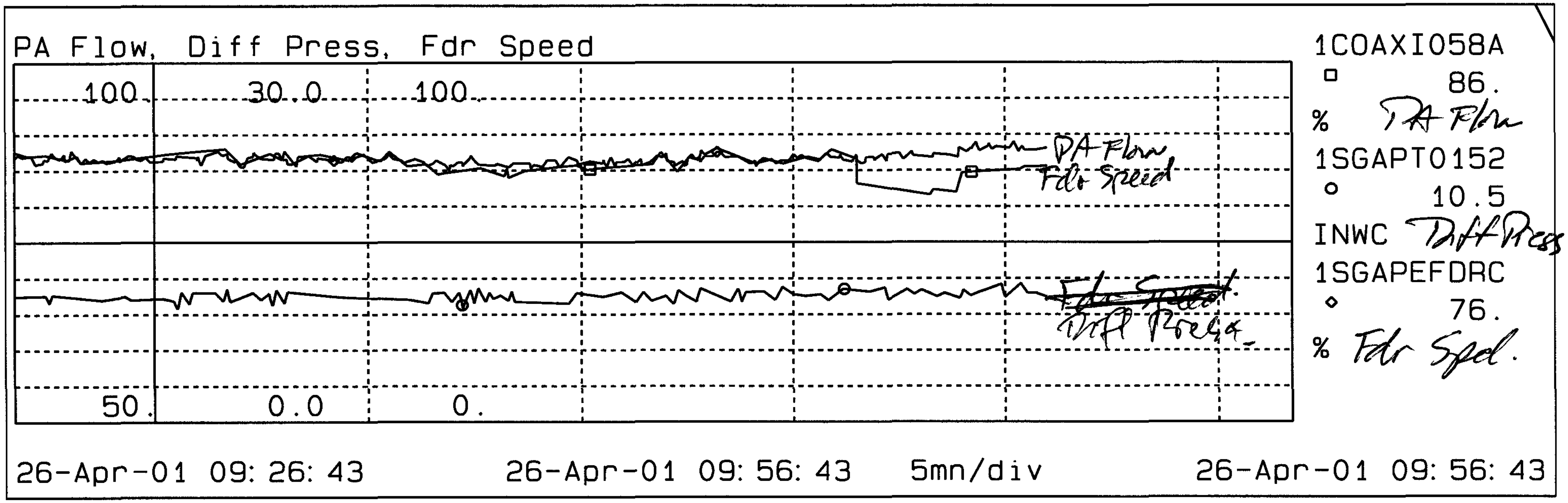
Beginning of 1C Pulv Throat Test.

Duct 8 Un. 1

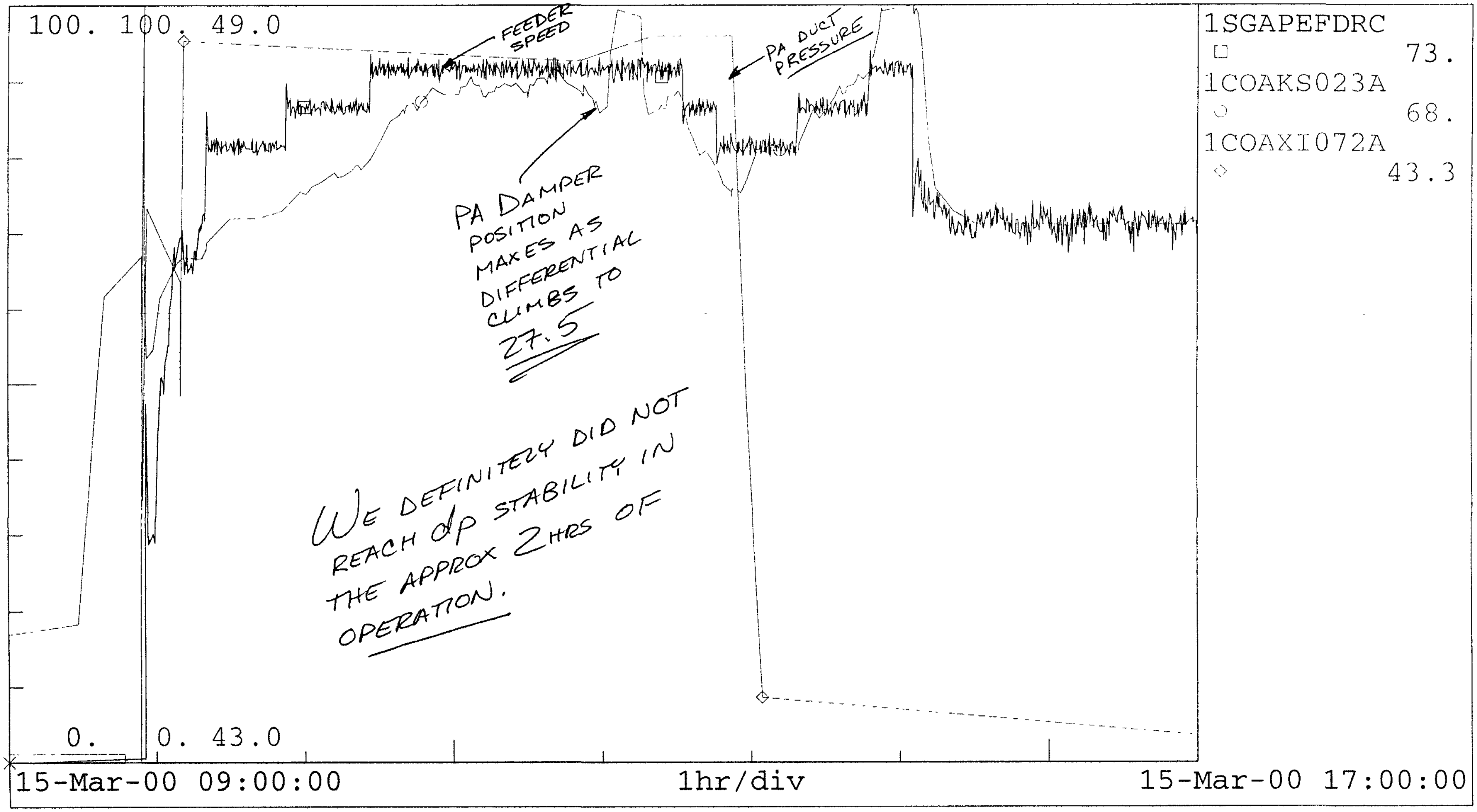
Printed out for: UNIT1OP - 26-Apr-01 09:51:10

0 Messages Pulv 1C c U1 Pulv 1C Test Trend 26-Apr-01 09:51:10





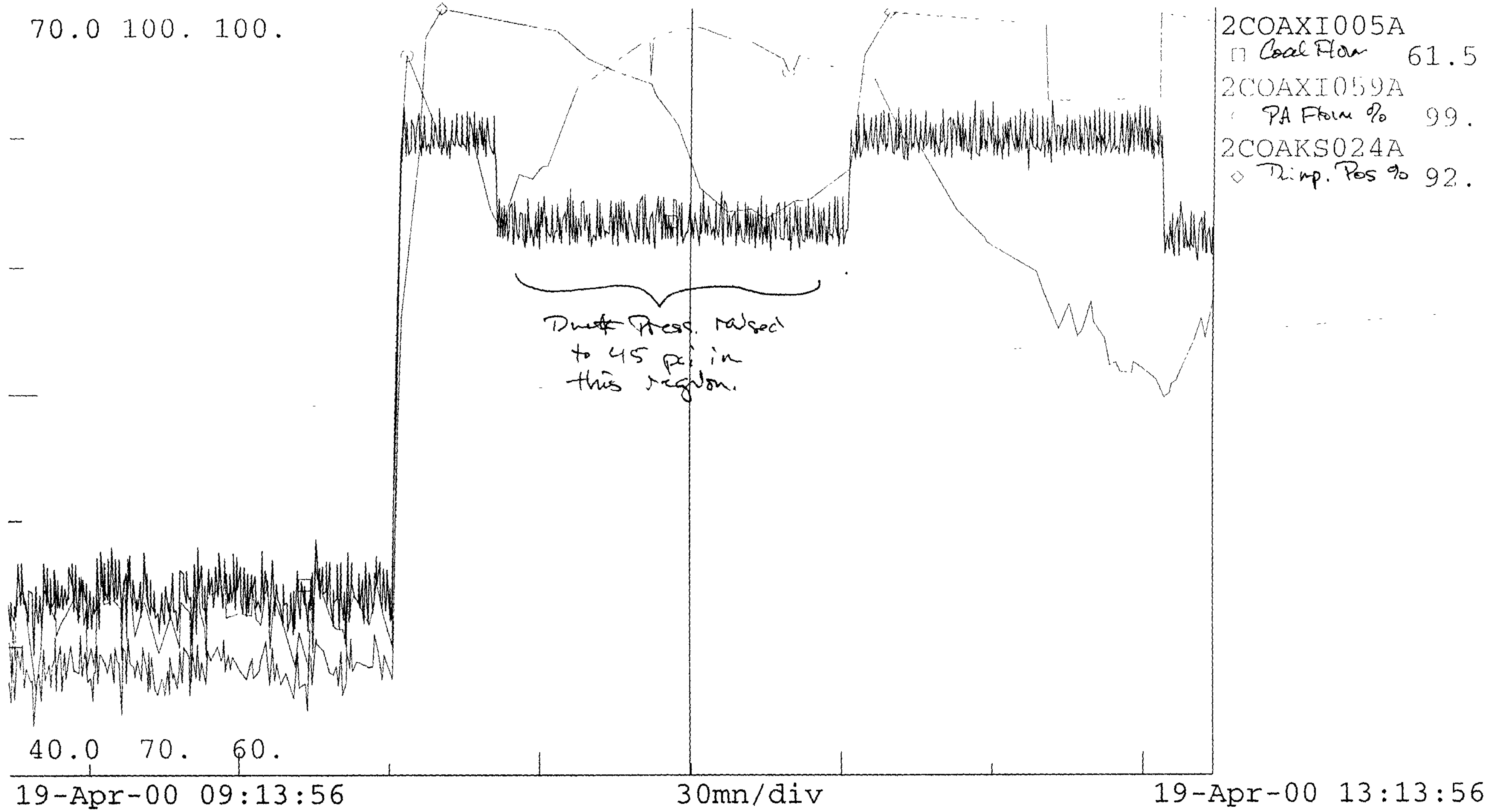
Printed out for: JAMES-N - 19-May-00 08:25:10
100 Messages U1 Pulv Unit 1 Pulv data 19-May-00 08:25:10



EndTim= 15-Mar-00 17:00:00 /EvalTim= 19-May-00 08:25:10 /PanRate= 0

IP12_001703

Printed out for: GARRY-C - 20-Apr-00 08:41:11
100 Messages U2 Pulv Unit 2 Pulv data 20-Apr-00 08:41:11



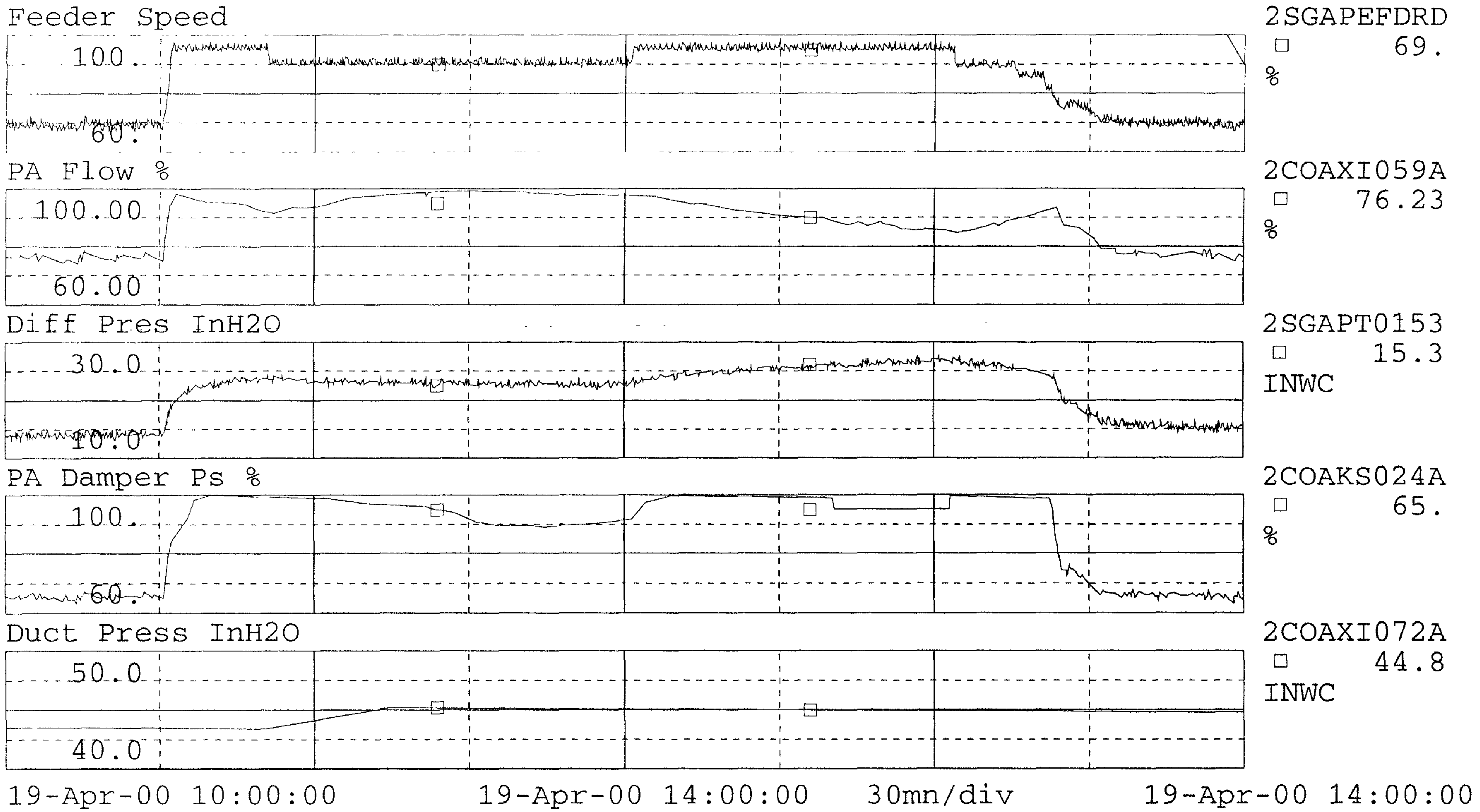
EndTim= 19-Apr-00 13:13:56 /EvalTim= 19-Apr-00 11:29:46 /PanRate= 0

IP12_001704

4-19-00

Unit 2 Pulv	Test 1 D	Test 2 D	Test 3 D
% Feeder Speed	96.0	93.9	95.4
Actual Pulv Coal Flow (tph)	65.3	63.9	64.9
PA Damper Position (%)	91.1	86.8	99.4
PA Flow (%)	98.1	98.8	93.3
PA Inlet Damper Temp (DEGF)	376.0	379.4	332.0
Pulv PA air temp comp (Deg F)	379.5	377.2	335.9
PA D/P (INWC)	22.3	20.2	24.9
Disch Temp (DEGF)	151.2	149.2	150.1
Pulv Motor (amps)	64.3	64.3	66.2
Pulv C amp swing	8.6	8.0	8.4
Hydraulic Skid Press FeedBack	2378	2147	2214
Hydraulic Skid Press Set Pt	2400	2400	2395
Skid Mode	auto/master	auto/master	
Local Read	2400		
PULV 1D, 30K OVRHAUL HOURS	106	890	1803
Pulv Air to Fuel Ratio	1.79	1.82	1.71
Pulv Pitot Tube DP (INWC)	4.00	4.01	3.43
PA Mass Flowrate (lb/min)	3892	3881	3691
Coal Pipe Velocity (ft/min)	4352		
Pulv Temp air flow	1386	1354	1690
Pulv Air Bias	0.0	0.0	0.0
Pulv Coal Bias	0.0	0.0	0.0
Barometric Pressure (inhg)	25.59	25.23	25.49
Pri Air Duct Pressure (inwc)	45.19	44.71	45.22

Printed out for: CECIL-J - 20-Apr-00 10:09:54
0 Messages PH-test unit 2 D pulv 20-Apr-00 10:09:54

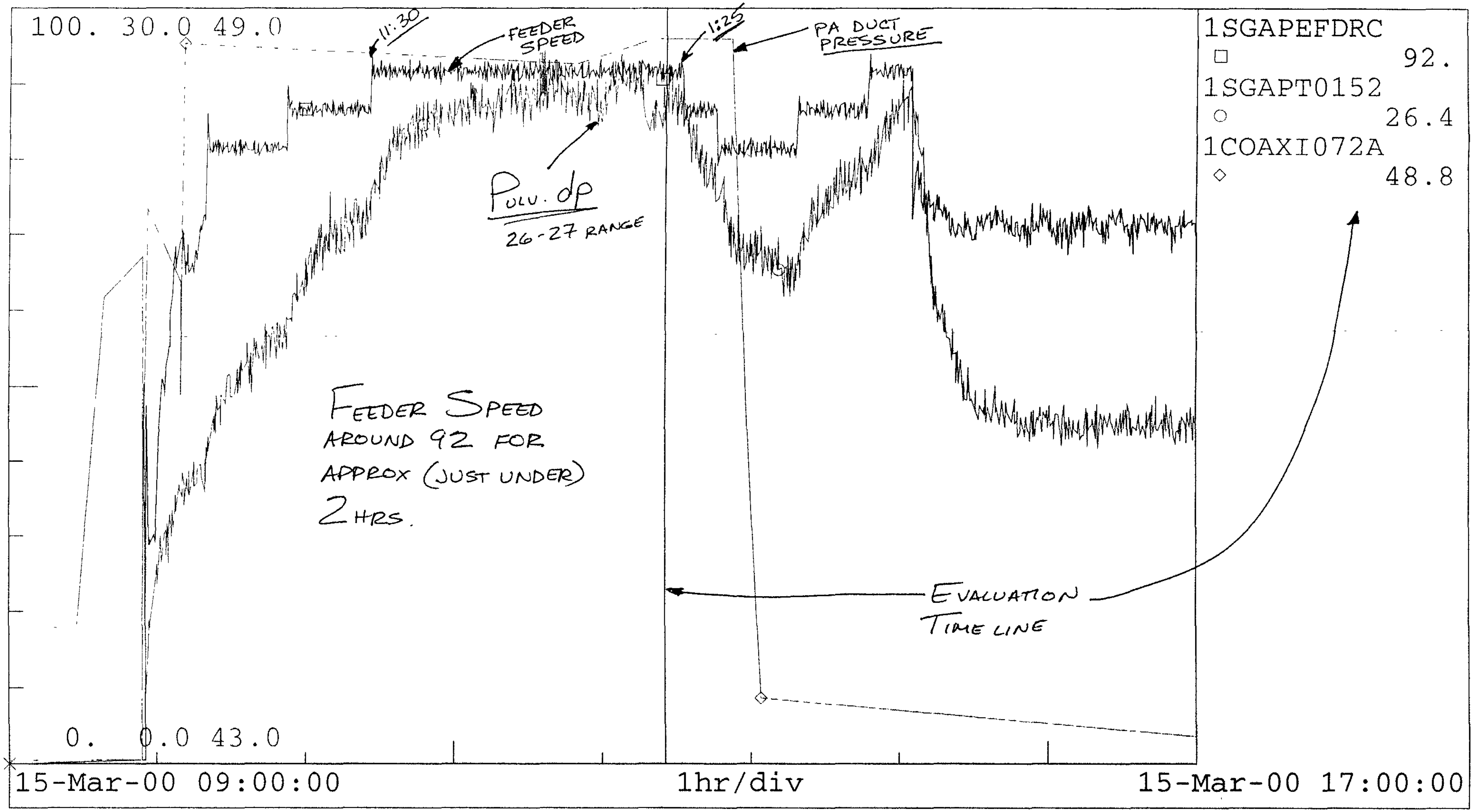


IP12_001706

NOT A CONVINCING DISPLAY OF STABILITY. Dp CONTINUES TO RISE UNTIL DAMPER MAX OUT. Dp NOT ACCEPTABLE AT 26-2

Printed out for: JAMES-N - 19-May-00 08:07:52

100 Messages U1 Pulv Unit 1 Pulv data 19-May-00 08:07:52



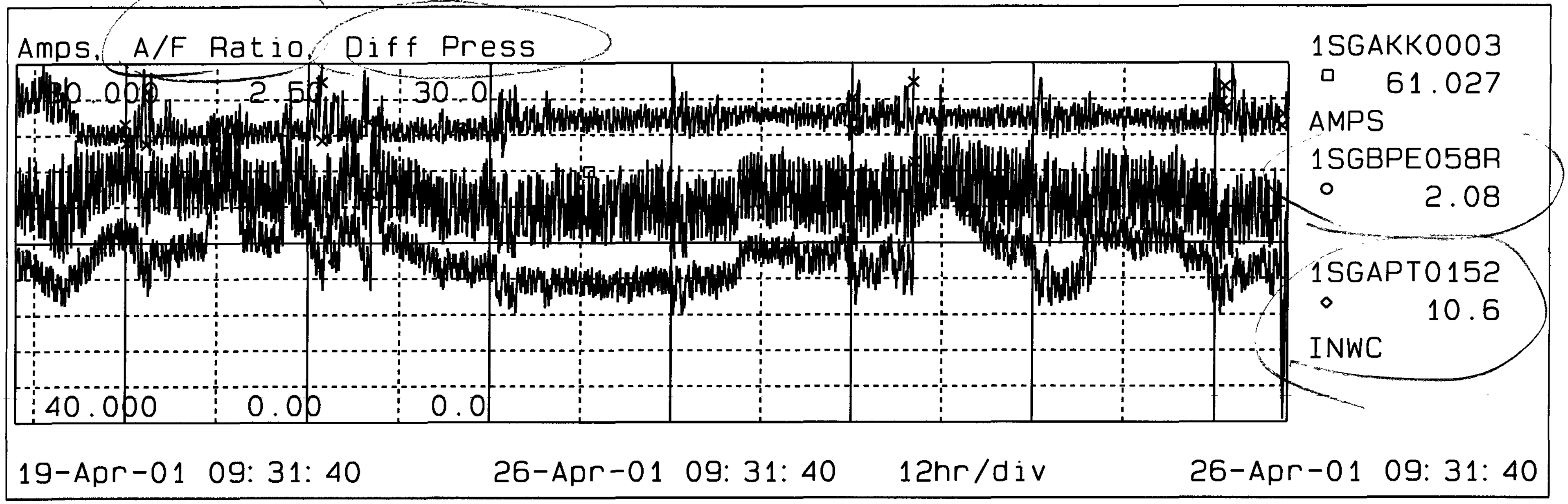
EndTim= 15-Mar-00 17:00:00 /EvalTim= 15-Mar-00 13:25:30 /PanRate= 0

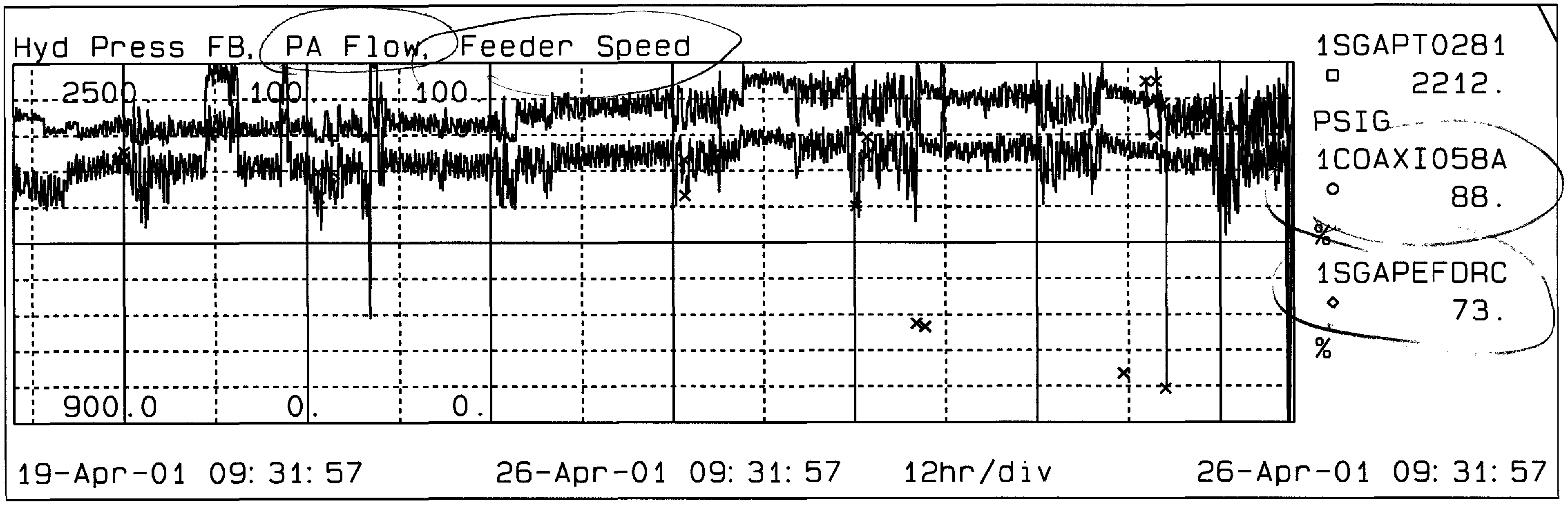
(FAX) 800-369-8061

Data Pts		Start time	End Time
2SGAPEFDRD	Test 1	12/14/1999 13:15	12/14/1999 14:15
2COAXI005A	Test 2	01/26/2000 12:30	01/26/2000 13:30
2COAKS024A	Test 3	04/19/2000 12:05	04/19/2000 12:35
2COAXI059A			
2SGATE0642			
2COAXI203A			
2SGAPT0153			
2COAXI067A			
2SGAKK0004			
2SGAPE1004			
2SGAPT0282			
2COAXI234A			
2SGATZ008C			
2sgbpe059r			
2Coaxi241D			
2SGBpe0059			
2SGBPE059V			
2SGBPX4068			
2COAXI214A			
2COAXI224A			
2INAPT0227			
2COAXI072A			

Printed out for: UNIT10P - 26-Apr-01 09:32:52

0 Messages Pulv U1C Pulv U1C Trend- Rotating Throat 26-Apr-01 09:32:52



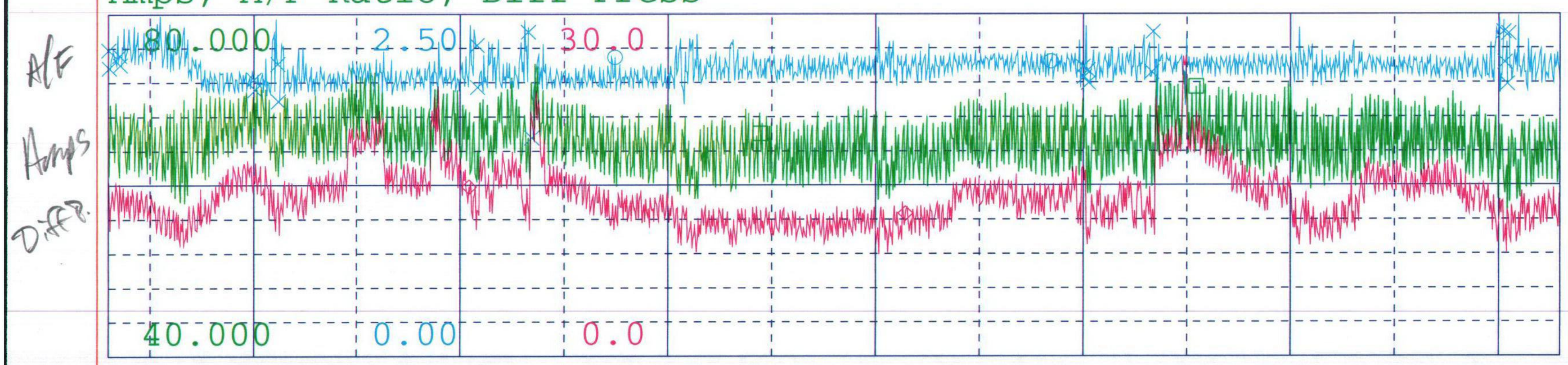


IC Mill prior to throat testing.

Printed out for: PHIL-H - 26-Apr-01 07:08:23

0 Messages Pulv U1C Pulv U1C Trend- Rotating Throat 26-Apr-01 07:08:23

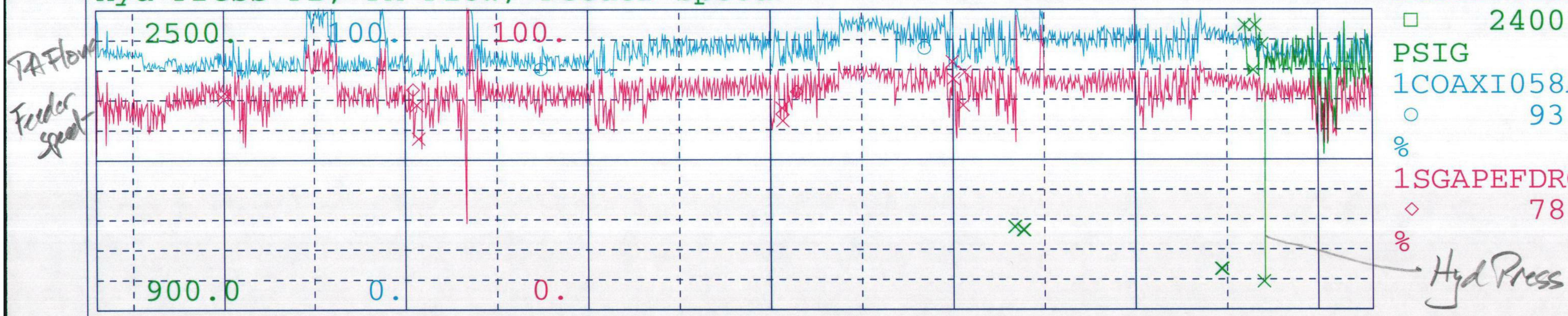
Amps, A/F Ratio, Diff Press



1SGAKK0003
□ 65.709
AMPS
1SGBPE058R
○ A/F 2.01
1SGAPT0152
◇ 13.4
INWC

19-Apr-01 07:07:02 26-Apr-01 07:07:02 12hr/div 26-Apr-01 07:07:02

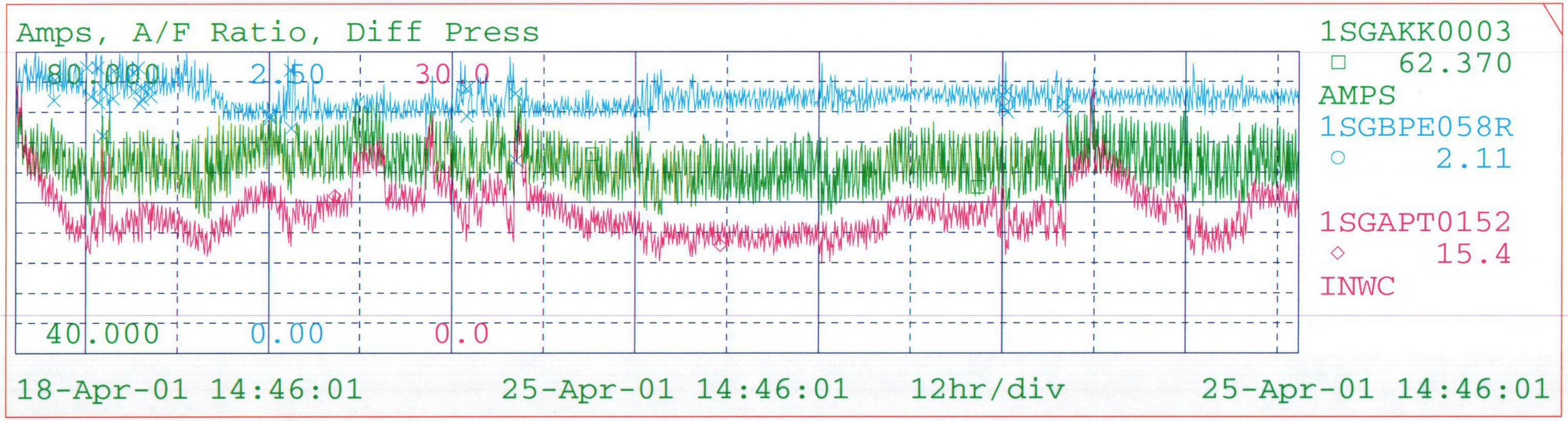
Hyd Press FB, PA Flow, Feeder Speed

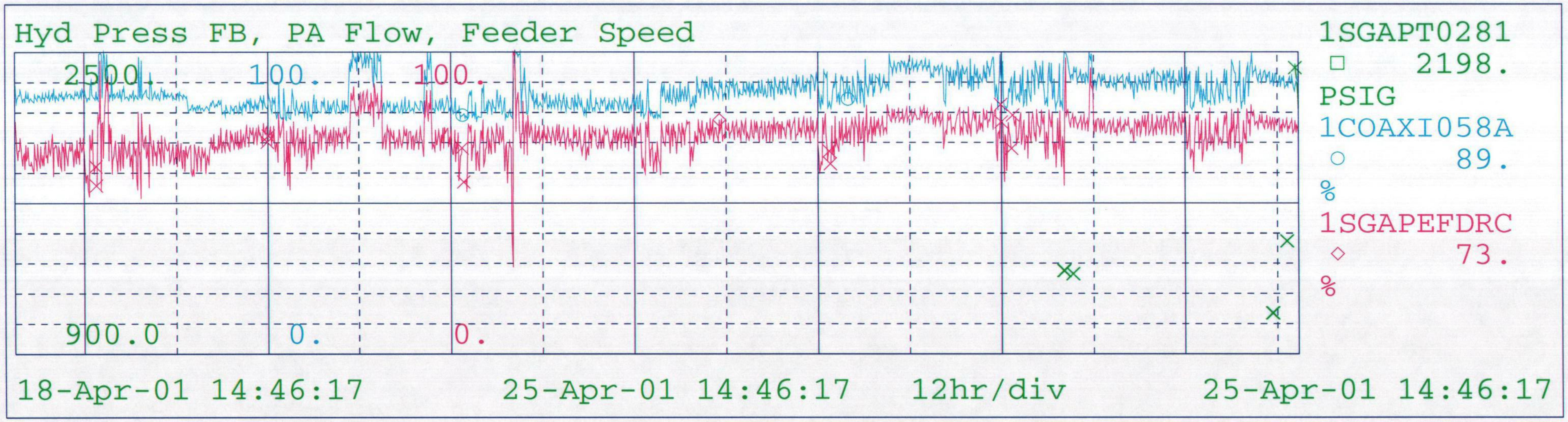


1SGAPT0281
□ 2400.
PSIG
1COAXI058A
○ 93.
%
1SGAPEFDRC
◇ 78.
%

19-Apr-01 07:07:20 26-Apr-01 07:07:20 12hr/div 26-Apr-01 07:07:20

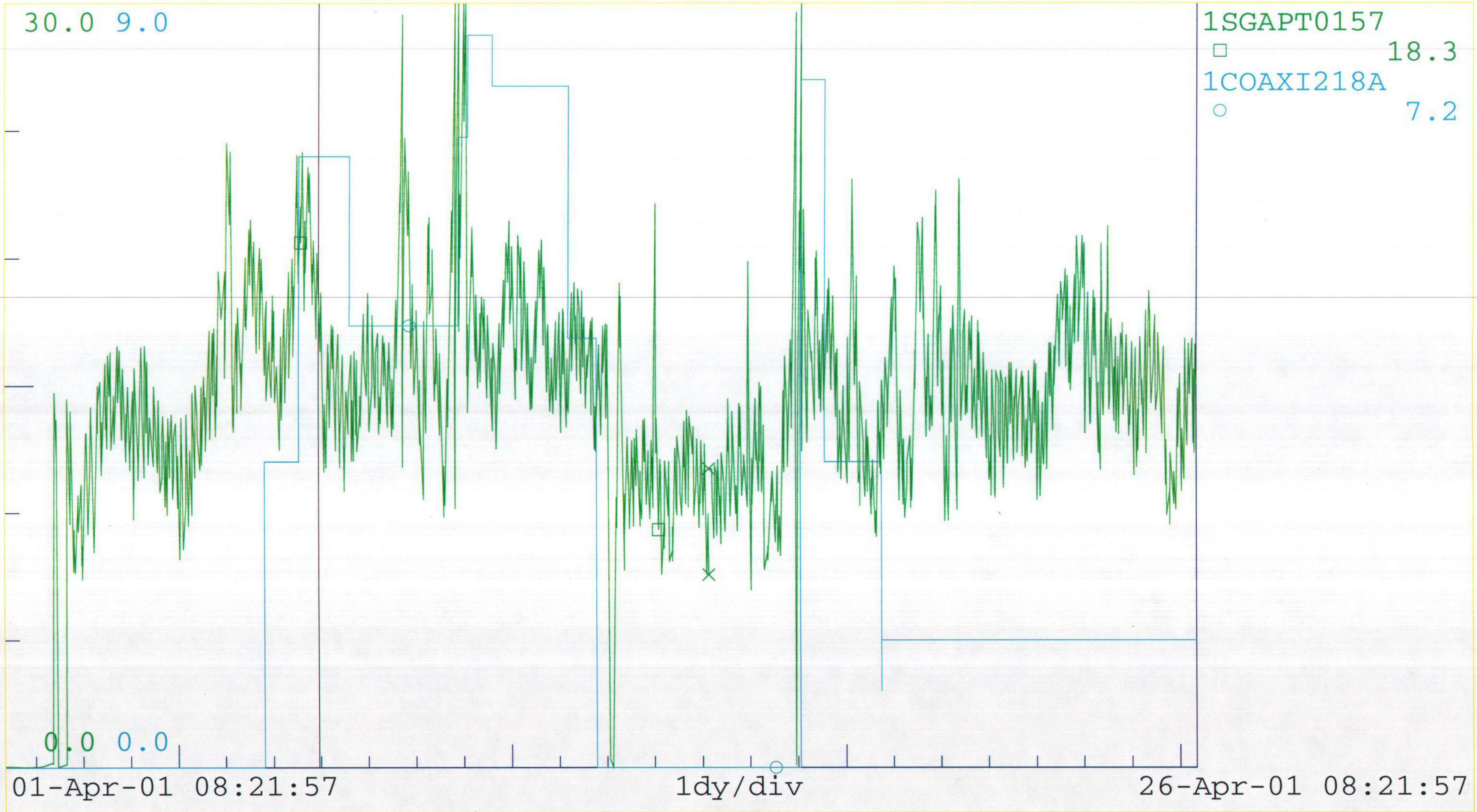
Printed out for: CECIL-J - 25-Apr-01 14:47:35
0 Messages Pulv U1C Pulv U1C Trend- Rotating Throat 25-Apr-01 14:47:35





IP12_001711

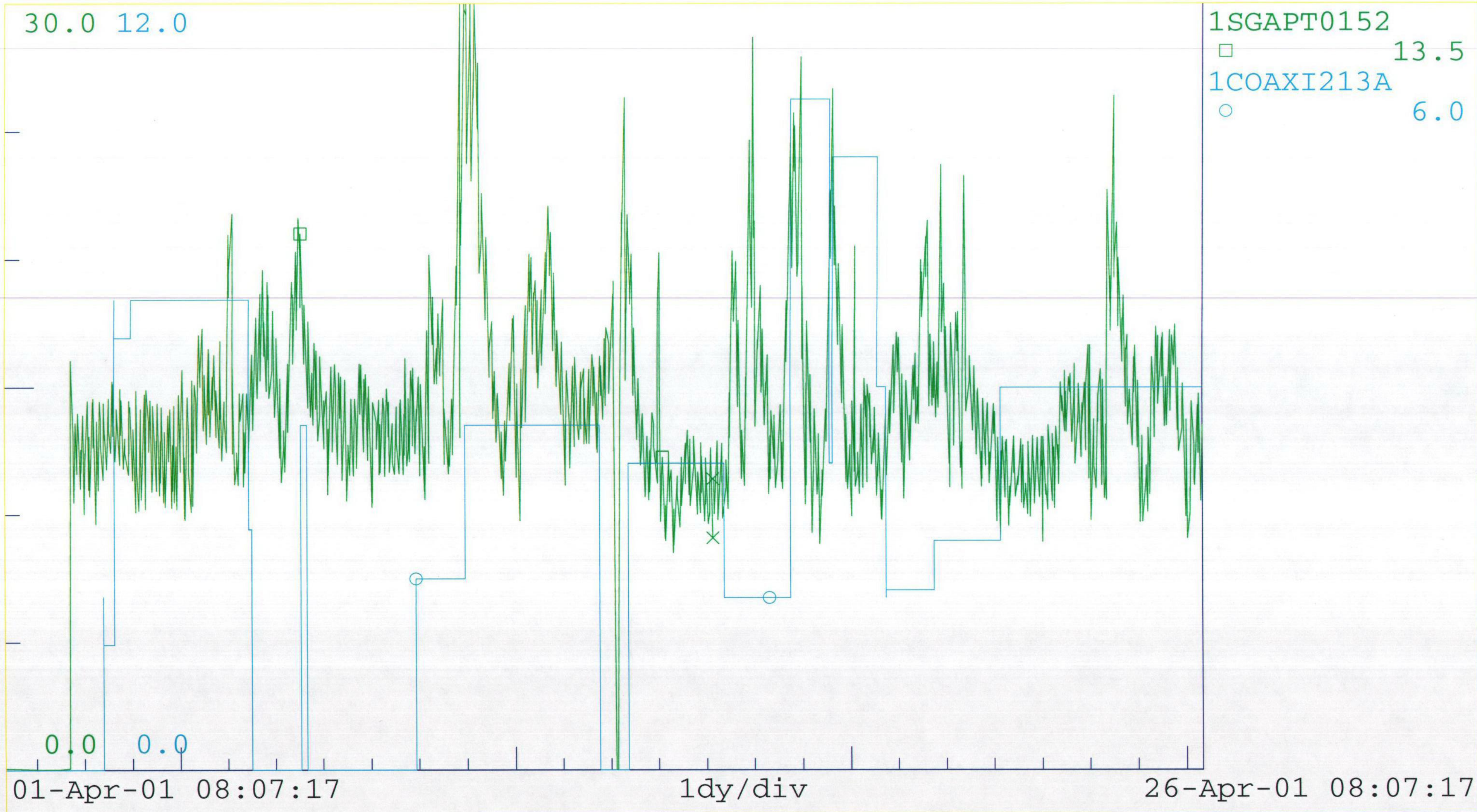
Printed out for: JAMES-N - 26-Apr-01 08:12:13
100 Messages U1 Pulv Unit 1 Pulv data 26-Apr-01 08:12:13



EndTim= 26-Apr-01 08:12:13 /EvalTim= 07-Apr-01 23:14:02 /PanRate= 0

IP12_001712

Printed out for: JAMES-N - 26-Apr-01 07:57:57
100 Messages U1 Pulv Unit 1 Pulv data 26-Apr-01 07:57:57



EndTim= 26-Apr-01 07:57:57 /EvalTim= 26-Apr-01 07:57:57 /PanRate= 0

Printed out for: CECIL-J - 25-Apr-01 12:51:59 Day prior to throat test

0 Messages U1 Pulv Unit 1 Pulv data 25-Apr-01 12:51:59

Unit 1 899.3 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow352.7TPH	48.9	Bad	51.3	49.7	50.0	50.2	50.2	51.4
Feeder Speed [redacted]	[redacted] 71.3	Calc	[redacted] 74.8	[redacted] 73.9	73.8	74.9	[redacted] 75.2	76.5
Amps (Duct Pr44.2) 42	61.2	0.0	64.5	64.2	65.5	58.7	60.0	65.4
Coal Pipe Vel	4327.	0.	4013.	3880.	3806.	3926.	4207.	4019.
PA Flow % ✓	97.8	0.0	89.8	88.2	88.8	88.9	95.7	90.2
PA Damper Pos	75.4	0.2	71.1	70.2	80.4	68.4	82.1	75.8
Pulv Pitot DP	3.85	0.00	2.95	3.37	2.97	3.13	3.87	3.34
PA Mass Flow ✓	3875.	0.	3620.	3506.	3404.	3522.	3796.	3610.
Pulv DP ✓	17.5	0.0	15.6	16.3	16.1	11.1	17.9	15.8
Air to Fuel Ratio	2.44	Calc	2.12	2.09	2.02	2.09	2.23	2.10
Pulv Inlet Temp	309.5	66.6	335.4	304.2	332.9	335.4	326.6	361.0
Pulv Outlet Temp	150.6	88.5	150.1	149.9	150.6	149.9	150.4	150.0
Coal Bias /COAXI223A ✓	-5.5	0.0	0.0	-2.2	0.0	0.0	0.0	0.0
Air Bias /COAXI213A ✓	10.5	0.0	6.0	0.0	0.0	0.0	5.7	1.5
Hyd Skid Pr Fdbk	6.	0.	3.	2241.	2126.	2344.	2323.	2211.
Hyd Skid Pr Setpt	2199.	1149.	2285.	2235.	2241.	2244.	2244.	2291.

EndTim= 25-Apr-01 12:51:59 /EvalTim= 25-Apr-01 12:51:59 /PanRate= 0

IP12_001714

Pulverizer 1C -OK

95% speeder feed - load-up? @ 42 in
45?
- Amps
- Fineness ? @ 95%.
@ 70%.

- Guarantee met?
Amps?
Fineness ? Old data.

Air Bias? No bias

ΔP ⇒ stability.

?!?

Duct press. 48 in during summer to overcome ΔP

~~A/F~~ current 1.9 (Bill Morgan).
F/A 2:1

Amps comparison to fixed-throats vs. rotating throat.

PI vs. BW (Hamills)
Higher or lower ΔP (2:1)? Which? Why? Fixed vs Rotating.

Amps 69KV - 4160 V. → 62 Amps.

Shield 2100 psi.

IP12_001715

AUXILIARY OPERATOR
Shift Log

Location: Unit 1 Bottom Ash

Shift: Night

Date: 24 April 01

1900	Relieved J. Zobel - J. Wilcox on shift
-	"B" mill - Dnco
-	A & C hyd. Skids O/S
-	Started pulling Ash "A" xfer pumps xover to "B" Line
-	Auto maintain.
1945	1st set of Readings - No Ash Above Water
2300	Finished pulling Ash - must have Bad coal!
-	pyrites in A, C, D, E, F, G & H mills - Bad.
0325	Last set of Readings - Still Lots of Pyrites
0640	pulled rejects in A, C, E, F, G & H mills

Name: Jay Wilcox

IP12_001716

- Air flow / Duct press
- Watch flow
- flame pattern.
- ~~Damper~~ position
- General status.
-

Bob A.
Jon P
Garry C.
~~James~~ H.
Dale H.

IP12_001717

AUXILIARY OPERATOR
Shift Log

Location: BA-U-1

Shift: 0700 - 1900 Date: 4-24-01

0700	Relieved J. Wilcox J. Zohel crew 2 on
	Bmill DND
	A+C Hyd skids O/S
0725	1st rounds A-OK rejects A-C-EF-G-H
0800	reject A C G H
	↓ ↓ ↓
1100	Hung clearance L-04-24-01-154 Cmill Hyd skid
1115	2nd rounds A-OK A C G H rejects
1230	STARTED A sh pull B pumps normal path
1300	Gone to respirator class A- Roper was here
1500	Back from class
	Rejects Rejects Rejects A-C-F-G-H
	↓ ↓ ↓
1840	pulled rejects A-C G H-

Name: Joe Zohel

Objective: Testing Performance of 1C Mill Throats.

- 95% feeder speed.
- ~~Damper - Bias~~ RA Damper Position
- Coal and Air Bias
- Hyd. Stud set point.
-

AUXILIARY OPERATOR
Shift Log

Location: U-2 Bottom Ash

Shift: Nights Date: April 23, 2001

1900	K Peterson on shift.
	"A" mill — o/s
	2C Sump Pp — DNO'd.
	"H" mill jet pp. — Have to "Manually" open.
1920	"H" mill has a fire — Working on it.
(	Rejects are calm for now.
2000	Readings and equipment checks complete — All is well!
2100	All hell broke loose — Major rejects in ~~A~~ B, D, E, F, G &
	H.
2200	Began pulling Ash with "A" pps & "A" line.
0001	A new day — April 24, 2001.
/	Fire in "E" mill — Working on it.
/	Hung clearance on "H" mill (3000 Hr.).
/	Took "A" Hyd. skid o/s and DNO'd it.
0430	Finished pulling ash — All went well.
/	Rejects cleared up FINALLY!!
*	OPPS * "A" mill i/s
	"F" is in a continuous pull. for rejects.

Name: [signature]

IP12_001720

P

AUXILIARY OPERATOR
Shift Log

Location: ~~U2~~-BOTTOM ASH

Shift: DAY   Date: 4-23-2001

0700	Relieved R. Peterson / R. Olcott on shift
	"H" Mill - DNO — 2B Sump pump - DNO
	"A" Hydro Sted - DNO — "F" Mill in Continuous pull.
	Rejects - in 'A' - 'D' - E - F - G -
720	Started pulling ash with 'B' pump in auto/manual.
825	Rounds Completed - no ash above wtr line.
0940	B. Wood here to cover for Ron's Resperator class
1035	G mill back
1200	Ron Back — Reject Continuous in all mills
1430	Fire in 'G' Mill
1445	Fire out in 'G' Mill
	ash pull Completed
1525	Rounds Completed
	Fire in 'G' Mill again
	Fire out in 'G' Mill - I hose
	I.G Replace air solenoid ~~to~~ the ~~Sluice~~ wt to B.F
	Reject pumps
	Pulled Tag- L-04-23-01-277 A Hydro Sted DNO
*	Do not put any coal out on the [redacted] the
	side of the Building — they are going to
	Re surface the Road.
*	'F' Mill Reject out let gate will not close FROM Control
	pannel only over by Mill.

Name: R. Olcott

IP12_001721

Start time	12/14/99 13:15	1/26/00 12:30	4/19/00 12:05	5/10/00 10:30	1/21/02 13:30	1/21/02 14:00	1/21/02 14:35
End time	12/14/99 14:15	1/26/00 13:30	4/19/00 12:35	5/10/00 11:00	1/21/02 13:55	1/21/02 14:30	1/21/02 15:05
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7
Unit 2 Pulv	D	D	D	D	D	D	D
% Feeder Speed	96.0	93.9	95.4	85.2	81.0	85.7	90.7
Actual Pulv Coal Flow (tph)	65.3	63.9	64.9	57.9	55.1	58.3	61.7
PA Damper Position (%)	91.1	86.8	99.4	85.1	80.5	85.7	94.3
PA Flow (%)	98.1	98.8	93.3	96.9	94.7	96.8	96.5
PA Inlet Damper Temp (DEGF)	376.0	379.4	332.0	311.0	356.7	360.5	360.5
Pulv PA air temp comp (Deg F)	379.5	377.2	335.9	309.8	360.1	359.4	364.8
PA D/P (INWC)	22.3	20.2	24.9	22.3	16.9	19.0	22.0
Disch Temp (DEGF)	151.2	149.2	150.1	150.3	150.6	150.2	150.4
Pulv Motor (amps)	64.3	64.3	66.2	62.7	59.0	59.9	62.4
Pulv D amp swing	8.6	8.0	8.4	8.7	6.2	6.0	5.7
Hydraulic Skid Press FeedBack	2378	2147	2214	2114	2045	2034	2031
Hydraulic Skid Press Set Pt	2400	2400	2395	2393	2394	2396	2399
Skid Mode	auto/master	auto/master			auto/master	auto/master	auto/master
Local Read	2400				2075		
PULV 1D, 30K OVRHAUL HOURS	106	890	1803	2204	3032	3032	3033
Pulv Air to Fuel Ratio	1.79	1.82	1.71	1.97	2.04	1.97	1.85
Pulv Pitot Tube DP (INWC)	4.00	4.01	3.43	3.59	3.65	3.81	3.81
PA Mass Flowrate (lb/min)	3892	3881	3691	3810	3743	3824	3810
Coal Pipe Velocity (ft/min)	4352	4383	4133	4340	4217	4309	4298
Pulv Temp air flow	1386	1354	1690	2006	1528	1558	1564
Pulv Air Bias	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pulv Coal Bias	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Barometric Pressure (inhg)	25.6	25.2	25.5	25.0	25.3	25.3	25.3
Pri Air Duct Pressure (inwc)	45.19	44 71	45.10	46.48	43.25	43.28	43.39

Jan 14, 02

Alstom Throats.

Fred Hess 570-586-9660
Jerry Chase } Windsor
Rob Tobias

Higher inlet temp on test. Why?
Need to calibrate the feeder.

Fineness. Overgrinding? Open classifiers.

Improved fineness ~~&~~ may leave room for closing the classifier.
"Swap fineness for capacity."

70% @ 200 mesh. @ 95% feeder speed.
1/2% @ 50 mesh. Keeps LOI down.

Lower feeder speeds improves fineness.

Open classifier up, to get to 95%. Then get fineness.

Do fineness @ 70% feed.

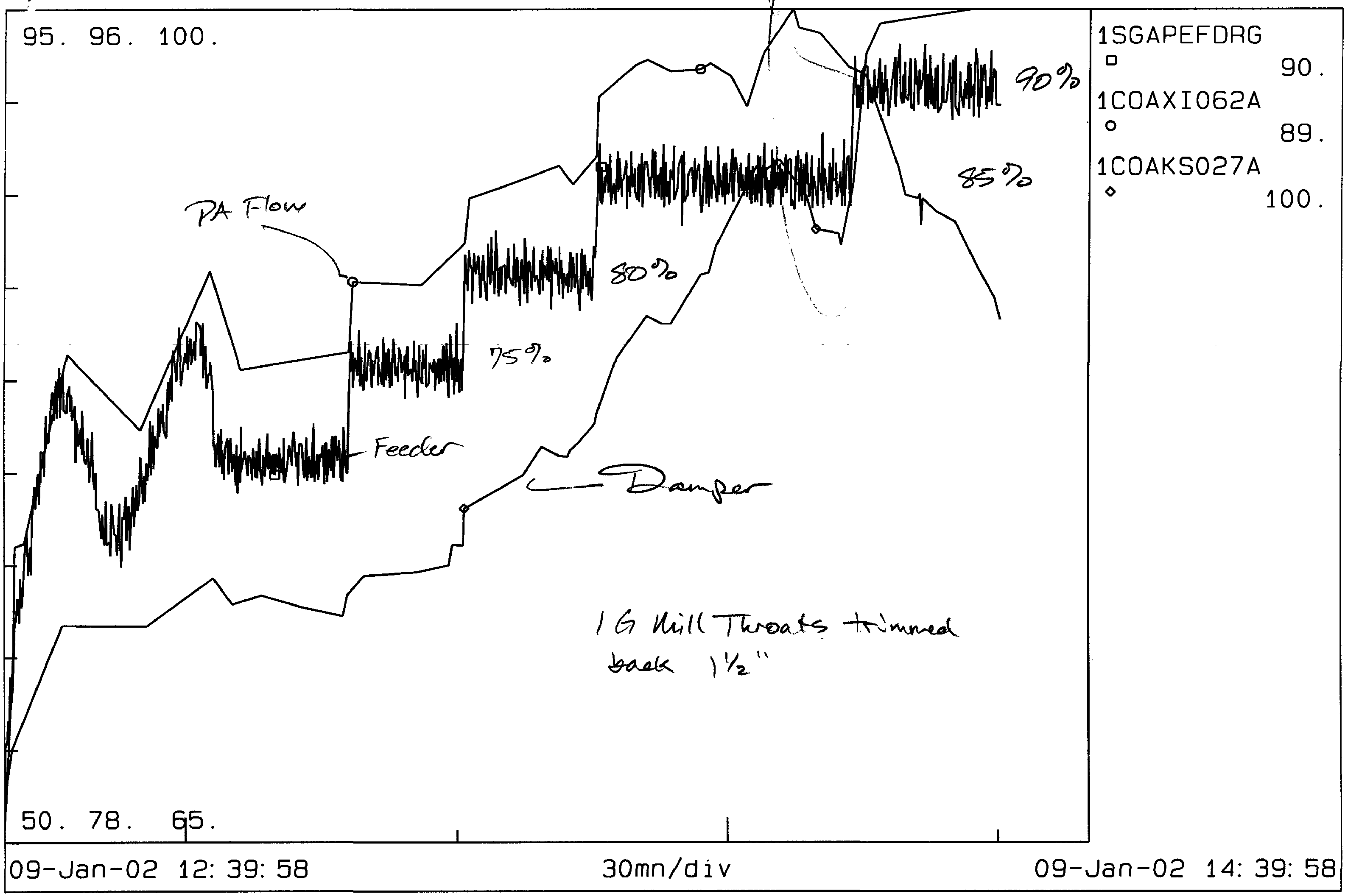
1) Fineness test.
2) Eliminate Temp impact.
3) Calibrate feeder
4) Open Classifier.

IP12_001723

Phil Hailes

Printed out for: UNIT1OP - 09-Jan-02 14:30:30

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 14:30:30



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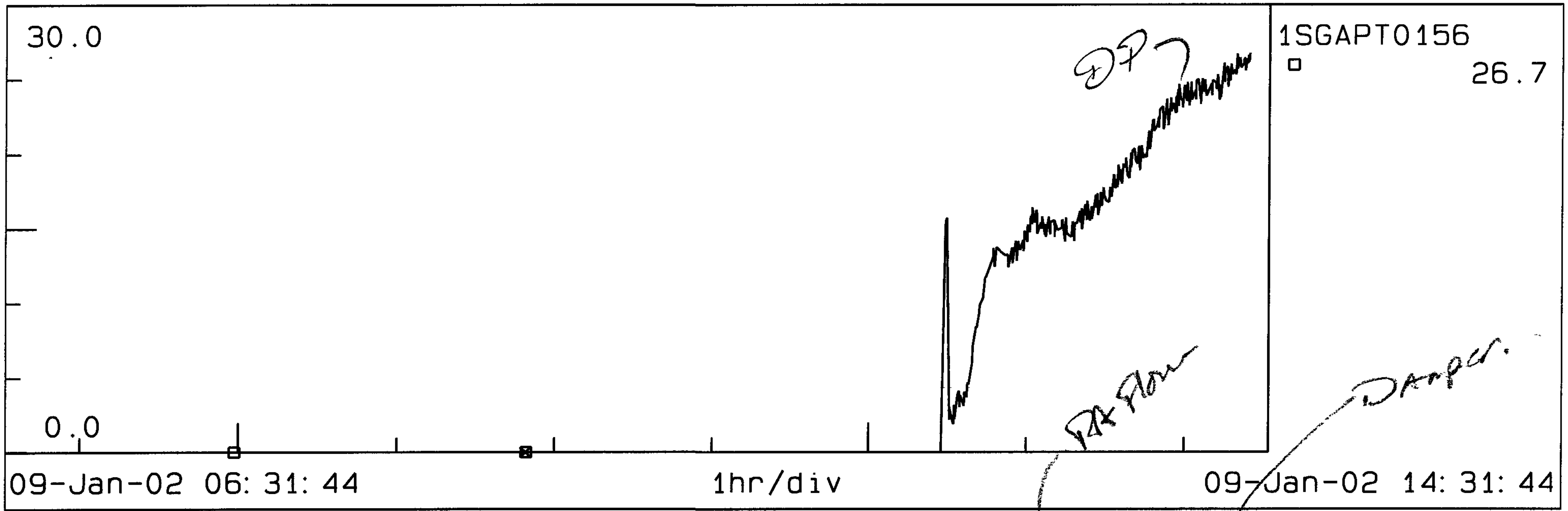
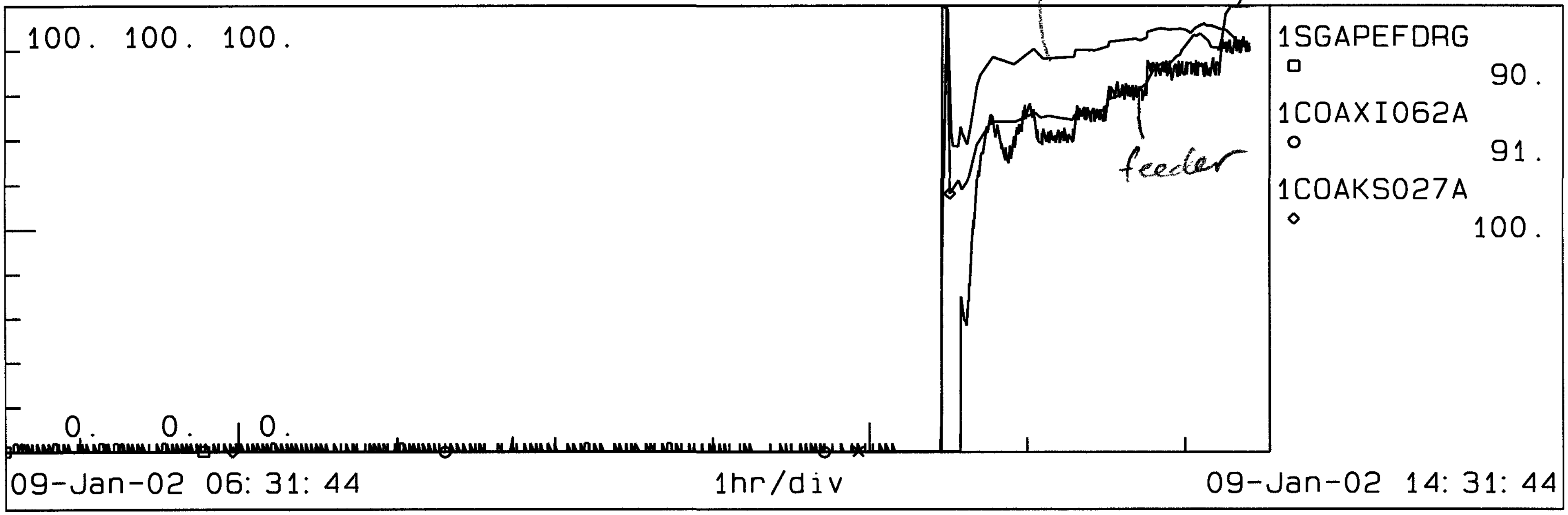
IP12_001724

Printed out for: UNIT1OP - 09-Jan-02 14:24:22
0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 14:24:22





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IP12_001725

1" REMOVED

Printed out for: UNIT1OP - 08-Jan-02 17:18:41

0 Messages U1 Pulv U1 Pulv Operating data 08-Jan-02 17:18:41

Unit 1 873.3MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow341.8TPH	49.6	51.0	51.7	51.6	44.0	50.4	47.8	0.7
Feeder Speed [redacted]	[redacted]	75.0	[redacted]	[redacted]	[redacted]	74.1	[redacted] 70%	1.1
Amps (Duct Pr44.0)	61.0	63.4	67.2	61.7	63.2	48.5	53.2	0.0
Coal Pipe Vel	4099.	4184.	3793.	3986.	4048.	4137.	3938.	0.
PA Flow %	93.1	93.9	84.0	89.2	95.0	93.1	88.4	0.0
PA Damper Pos	80.5	82.8	67.4	69.1	81.9	75.6	75.0	0.0
Pulv Pitot DP	3.55	3.62	2.64	3.53	3.27	3.57	3.56	0.00
PA Mass Flow	3657.	3722.	3386.	3549.	3615.	3690.	3497.	0.
Pulv DP (NOx 0.36)	17.1	15.7	12.4	13.7	16.1	15.9	16.0	0.0
Air to Fuel Ratio	2.20	2.19	1.95	2.06	2.48	2.16	2.22	0.00
Pulv Inlet Temp	326.3	315.0	353.2	323.8	303.5	367.4	382.5	99.3
Pulv Outlet Temp	150.1	151.9	149.9	151.5	149.7	150.3	153.1	110.7
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	14.6	-3.7
Air Bias	8.9	4.2	0.0	0.0	10.9	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2081.	2178.	2128.	2132.	1783.	2218.	2048.	1012.
Hyd Skid Pr Setpt	2222.	2275.	2299.	2303.	2014.	2252.	2156.	1149.

EndTim= 08-Jan-02 17:18:41 /EvalTim= 08-Jan-02 17:18:41 /PanRate= 0

1

IP12_001726

Printed out for: UNIT1OP - 08-Jan-02 17:37:10 1" cut

0 Messages U1 Pulv U1 Pulv Operating data 08-Jan-02 17:37:10

Unit 1 874.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow340.4TPH	46.2	48.3	49.3	48.8	40.3	48.4	51.6	0.7
Feeder Speed [redacted]	[redacted]	71.0	[redacted]	[redacted]	[redacted]	71.6	[redacted] 75	1.1
Amps (Duct Pr44.0)	63.7	61.7	65.0	59.5	62.0	47.4	54.9	0.0
Coal Pipe Vel	4150.	4125.	3602.	3910.	$\boxed{4012.}$	4074.	4049.	0.
PA Flow %	93.4	92.5	79.5	87.9	93.1	91.9	90.3	0.0
PA Damper Pos	79.1	81.5	64.4	67.6	81.2	74.0	77.6	0.0
Pulv Pitot DP	3.57	3.48	2.36	3.43	3.12	3.45	3.71	0.00
PA Mass Flow	3702.	3663.	3191.	3464.	3560.	3632.	3574.	0.
Pulv DP (NOx 0.36)	16.1	15.4	12.2	13.5	16.7	15.6	17.9	0.0
Air to Fuel Ratio	2.33	2.26	1.97	2.11	2.67	2.24	2.11	0.00
Pulv Inlet Temp	325.0	308.1	351.0	322.9	301.3	365.2	383.5	97.9
Pulv Outlet Temp	149.9	151.5	149.9	151.9	149.7	150.3	152.8	110.3
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	14.6	-3.7
Air Bias	8.9	4.2	0.0	0.0	10.9	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2076.	2179.	2128.	2103.	1770.	2218.	2100.	1010.
Hyd Skid Pr Setpt	2099.	2175.	2212.	2200.	1865.	2181.	2297.	1149.

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2

IP12_001727

Printed out for: UNIT1OP - 08-Jan-02 18:01:58 1" cut

0 Messages U1 Pulv U1 Pulv Operating data 08-Jan-02 18:01:58

Unit 1 876.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow340.7TPH	47.2	48.9	48.7	50.3	40.9	48.9	54.5	0.7
Feeder Speed[redacted]	[redacted]	71.5	[redacted]	[redacted]	[redacted]	71.6	[redacted]	1.1
Amps (Duct Pr44.0)	60.2	62.4	64.9	60.5	61.5	49.0	57.7	0.0
Coal Pipe Vel	4185.	4108.	3535.	3891.	4018.	4064.	4128.	0.
PA Flow %	94.3	92.3	79.3	88.3	93.3	91.2	92.1	0.0
PA Damper Pos	78.7	81.9	64.3	66.6	81.1	73.6	81.5	0.0
Pulv Pitot DP	3.60	3.45	2.35	3.44	3.14	3.39	3.90	0.00
PA Mass Flow	3735.	3653.	3152.	3465.	3579.	3624.	3666.	0.
Pulv DP (NOx 0.35)	16.5	15.6	12.4	13.3	16.4	15.3	19.6	0.0
Air to Fuel Ratio	2.41	2.25	1.93	2.11	2.64	2.23	2.00	0.00
Pulv Inlet Temp	322.9	306.2	351.3	318.6	301.2	363.4	396.0	96.1
Pulv Outlet Temp	149.7	151.9	150.1	151.9	150.9	150.1	152.8	109.5
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	8.9	4.2	0.0	0.0	10.9	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2075.	2177.	2128.	2124.	1739.	2217.	2209.	1010.
Hyd Skid Pr Setpt	2132.	2199.	2193.	2221.	1881.	2199.	2400.	1149.

EndTim= 08-Jan-02 18:01:58 /EvalTim= 08-Jan-02 18:01:58 /PanRate= 0

3

IP12_001728

Printed out for: UNIT1OP - 08-Jan-02 16:55:22

1" REMOVED

0 Messages U1 Pulv U1 Pulv Operating data 08-Jan-02 16:55:22

Unit 1 873.8 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow341.9TPH	48.4	50.0	50.0	50.6	43.0	50.1	61.5	0.7
Feeder Speed[redacted]	[redacted]	73.6	[redacted]	[redacted]	[redacted]	73.5	[redacted] 90%	1.1
Amps (Duct Pr43.9)	60.7	59.7	64.4	60.5	60.9	48.4	61.0	0.0
Coal Pipe Vel	4215.	4122.	3594.	3908.	4041.	4060.	4212.	0.
PA Flow %	95.3	92.4	81.2	87.9	93.7	91.3	94.5	0.0
PA Damper Pos	78.8	81.5	65.6	67.7	81.0	73.9	99.2	0.0
Pulv Pitot DP	3.65	3.48	2.48	3.41	3.17	3.40	4.24	0.00
PA Mass Flow	3764.	3669.	3209.	3479.	3602.	3619.	3742.	0.
Pulv DP (NOx 0.37)	15.9	15.1	11.6	13.4	15.6	14.8	25 6	0.0
Air to Fuel Ratio	2.36	2.22	1.93	2.09	2.61	2.21	1.82	0.00
Pulv Inlet Temp	312.2	309.3	356.1	320.2	299.5	361.8	426.6	100.7
Pulv Outlet Temp	149.7	151.5	149.7	151.5	150.8	150.8	152.8	111.5
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	14.6	-3.7
Air Bias	8.9	4.2	0.0	0.0	10.9	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2090.	2178.	2127.	2125.	1727.	2219.	2259.	1013.
Hyd Skid Pr Setpt	2181.	2237.	2235.	2259.	1911.	2241.	2400.	1149.

EndTim= 08-Jan-02 16:55:22 /EvalTim= 08-Jan-02 16:55:22 /PanRate= 0

4

IP12_001729

Printed out for: UNIT1OP - 09-Jan-02 13: 10: 33

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 13: 10: 33

Unit 1 877.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	15" cut Pulv G	Pulv H
Coal Flow336.3TPH	46.9	48.0	48.3	48.7	40.1	0.6	47.8	46.5
Feeder Speed [redacted]	[redacted]	71.0	[redacted]	[redacted]	[redacted]	0.9	[redacted] 70.3	68.7
Amps (Duct Pr43.9	62.9	64.5	67.5	63.2	59.7	0.0	52.2	64.0
Coal Pipe Vel	4274.	4272.	3501.	3902.	4145.	222.	3944.	4359.
PA Flow %	96.0	95.6	78.3	87.2	96.2	5.3	88.1	98.1
PA Damper Pos	84.0	86.0	64.7	68.2	84.6	0.0	74.8	76.7
Pulv Pitot DP	3.70	3.65	2.21	3.26	3.34	0.01	3.52	3.83
PA Mass Flow	3802.	3787.	3118.	3465.	3656.	208.	3499.	3883.
Pulv DP (NOx 0.48	19.0	18.5	12.8	15.3	18.2	0.0	15.2	14.2
Air to Fuel Ratio	2.43	2.35	1.94	2.12	2.72	10.	2.17	2.49
Pulv Inlet Temp	307.0	290.7	325.7	297.9	300.1	128.2	378.4	335.6
Pulv Outlet Temp	151.4	153.6	147.3	152.3	156.6	120.5	153.1	150.6
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2079.	2194.	2112.	2105.	2321.	934.	2011.	2009.
Hyd Skid Pr Setpt	2125.	2165.	2177.	2196.	1843.	1149.	2159.	2113.

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5

IP12_001730

Printed out for: UNIT1OP - 09-Jan-02 13:30:09

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 13:30:09

Unit 1 875.8 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	18" cut Pulv G	Pulv H
Coal Flow336.4TPH	48.9	50.6	51.2	51.3	42.4	0.6	51.8	49.1
Feeder Speed [redacted]	[redacted]	74.0	[redacted]	[redacted]	[redacted]	0.9	[redacted] 75	71.8
Amps (Duct Pr43.4)	58.5	61.7	65.7	59.4	60.0	0.0	55.4	67.0
Coal Pipe Vel	4365.	4312.	3700.	3925.	4140.	221.	4037.	4416.
PA Flow %	97.6	96.8	82.8	88.9	96.7	5.2	90.3	99.1
PA Damper Pos	83.6	86.7	67.0	69.2	83.5	0.0	77.4	76.9
Pulv Pitot DP	3.72	3.67	2.52	3.41	3.18	0.01	3.66	3.87
PA Mass Flow	3888.	3830.	3301.	3487.	3693.	207.	3581.	3926.
Pulv DP (NOx 0.47)	18.5	18.0	12.3	14.8	18.3	0.0	17.4	13.9
Air to Fuel Ratio	2.40	2.27	1.98	2.06	2.65	10.	2.10	2.42
Pulv Inlet Temp	289.9	280.9	338.4	301.0	252.7	135.4	377.2	333.4
Pulv Outlet Temp	150.6	152.3	149.7	152.3	149.4	120.3	153.1	151.9
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2074.	2194.	2111.	2168.	2320.	934.	2142.	2118.
Hyd Skid Pr Setpt	2199.	2264.	2280.	2293.	1937.	1149.	2305.	2204.

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6

Printed out for: UNIT1OP - 09-Jan-02 13:45:07

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 13:45:07

Unit 1 874.8MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	1½" cut Pulv G	Pulv H
Coal Flow333.7TPH	47.5	49.1	49.7	49.6	41.0	0.6	53.9	47.3
Feeder Speed [redacted]	[redacted]	72.3	[redacted]	[redacted]	[redacted]	0.9	[redacted] 80	69.8
Amps (Duct Pr43.8)	59.4	60.9	60.9	59.4	60.5	0.0	55.9	64.4
Coal Pipe Vel	4323.	4281.	3582.	3911.	4120.	220.	4122.	4381.
PA Flow %	97.5	95.9	80.2	87.6	95.6	5.2	92.5	98.3
PA Damper Pos	81.3	85.2	65.0	68.2	82.2	0.0	81.6	76.1
Pulv Pitot DP	3.70	3.62	2.36	3.30	3.10	0.01	3.87	3.80
PA Mass Flow	3851.	3800.	3196.	3474.	3672.	206.	3656.	3897.
Pulv DP (NOx 0.48)	17.6	17.3	12.1	14.4	17.3	0.0	20.1	12.1
Air to Fuel Ratio	2.48	2.32	1.95	2.11	2.74	10.	1.99	2.49
Pulv Inlet Temp	283.1	282.0	338.6	301.0	255.2	137.3	376.9	330.2
Pulv Outlet Temp	150.6	152.8	149.7	152.3	150.1	119.6	153.1	151.4
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2003.	2194.	2110.	2127.	2320.	933.	2177.	2038.
Hyd Skid Pr Setpt	2146.	2206.	2226.	2224.	1905.	1149.	2382.	2140.

EndTim= 09-Jan-02 13:45:07 /EvalTim= 09-Jan-02 13:45:07 /PanRate= 0

Printed out for: UNIT1OP - 09-Jan-02 14:13:19

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 14:13:19

1½" cw

Unit 1 874.8MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow330.2TPH	44.7	47.0	46.9	47.4	38.2	0.6	58.1	45.4
Feeder Speed [redacted]	[redacted]	69.1	[redacted]	[redacted]	[redacted]	0.9	[redacted] 85	66.6
Amps (Duct Pr43.6)	58.5	61.5	61.4	59.2	56.2	0.0	58.0	62.2
Coal Pipe Vel	4284.	4214.	3425.	3814.	4082.	220.	4224.	4309.
PA Flow %	96.2	94.2	76.9	86.5	94.8	4.5	94.2	96.7
PA Damper Pos	79.7	83.7	63.0	66.4	81.8	0.0	91.1	74.8
Pulv Pitot DP	3.65	3.50	2.15	3.23	3.14	0.01	3.98	3.65
PA Mass Flow	3810.	3737.	3060.	3388.	3615.	206.	3751.	3829.
Pulv DP (NOx 0.48)	17.8	16.8	11.8	12.8	16.1	0.0	24.7	12.0
Air to Fuel Ratio	2.56	2.41	1.97	2.16	2.86	10.	1.96	2.55
Pulv Inlet Temp	290.0	284.9	330.2	299.0	274.2	137.4	371.7	324.3
Pulv Outlet Temp	151.5	153.1	148.8	152.3	154.1	118.4	152.3	151.9
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	1950.	2193.	2111.	2010.	2320.	934.	2428.	1940.
Hyd Skid Pr Setpt	2043.	2127.	2124.	2144.	1787.	1149.	2400.	2069.

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IP12_001733

Printed out for: UNIT1OP - 09-Jan-02 14:00:16

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 14:00:16

Unit 1 872.5MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	15" cut Pulv G	Pulv H
Coal Flow333.0TPH	46.5	47.4	47.4	48.0	38.9	0.6	58.5	45.9
Feeder Speed [redacted]	[redacted]	69.8	[redacted]	[redacted]	[redacted]	0.9	[redacted] 8	67.3
Amps (Duct Pr44.1)	60.4	60.9	66.2	58.7	58.2	0.0	55.2	66.2
Coal Pipe Vel	4323.	4247.	3459.	3874.	4084.	220.	4215.	4349.
PA Flow %	97.5	94.9	77.5	86.4	94.6	5.2	95.1	97.6
PA Damper Pos	80.1	84.2	63.6	66.9	81.6	0.0	90.6	75.2
Pulv Pitot DP	3.70	3.54	2.21	3.21	3.04	0.01	4.08	3.76
PA Mass Flow	3876.	3767.	3096.	3444.	3649.	206.	3749.	3867.
Pulv DP (NOx 0.48)	18.0	16.9	11.5	13.7	16.3	0.0	24.0	12.4
Air to Fuel Ratio	2.54	2.41	1.97	2.15	2.81	10.	1.95	2.53
Pulv Inlet Temp	285.0	280.0	337.8	299.1	256.8	137.7	385.7	330.5
Pulv Outlet Temp	150.6	153.1	149.7	151.9	151.1	118.9	153.1	151.9
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2002.	2195.	2111.	2077.	2321.	934.	2177.	1949.
Hyd Skid Pr Setpt	2111.	2143.	2141.	2169.	1830.	1149.	2400.	2088.

EndTim= 09-Jan-02 14:00:15 /EvalTim= 09-Jan-02 14:00:15 /PanRate= 0

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IP12_001734

90%

Printed out for: UNIT1OP - 09-Jan-02 14:27:52

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 14:27:52

Unit 1 875.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow331.0TPH	44.8	46.0	45.8	46.5	37.4	0.6	62.7	44.2
Feeder Speed [redacted]	[redacted]	67.7	[redacted]	[redacted]	[redacted]	0.9	[redacted] 90%	65.3
Amps (Duct Pr44.1)	59.4	63.5	68.5	61.0	58.7	0.0	58.0	61.0
Coal Pipe Vel	4287.	4177.	3385.	3827.	4049.	190.	4051.	4285.
PA Flow %	95.5	93.3	76.2	85.3	93.6	5.2	90.6	96.3
PA Damper Pos	78.6	82.6	62.8	65.5	81.3	0.0	100.	74.6
Pulv Pitot DP	3.57	3.46	2.10	3.13	3.09	0.01	3.79	3.62
PA Mass Flow	3810.	3703.	3028.	3396.	3579.	179.	3594.	3811.
Pulv DP (NOx 0.49)	17.6	16.9	12.2	13.2	17.1	0.0	26.1	11.7
Air to Fuel Ratio	2.59	2.44	1.99	2.20	2.85	9.01	1.76	2.58
Pulv Inlet Temp	292.2	286.0	329.1	299.0	282.2	136.6	403.7	326.1
Pulv Outlet Temp	151.9	153.8	148.4	152.8	155.0	117.8	153.1	151.9
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	1928.	1930.	2111.	1992.	2320.	934.	2436.	1912.
Hyd Skid Pr Setpt	2050.	2089.	2084.	2116.	1787.	1149.	2400.	2024.

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IP12_001735

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0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 15: 19: 47

Unit 1 876.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow346.4TPH	51.6	53.3	52.8	53.9	45.3	0.6	48.5	51.5
Feeder Speed [redacted]	[redacted]	78.7	[redacted]	[redacted]	[redacted]	0.9	[redacted] 70%	75.8
Amps (Duct Pr43.5)	60.7	64.2	62.2	58.9	60.2	0.0	54.4	65.0
Coal Pipe Vel	4281.	4392.	4051.	4017.	4189.	190.	3346.	4492.
PA Flow %	96.3	99.1	88.5	90.0	98.2	4.5	75.1	100.
PA Damper Pos	85.8	90.2	71.3	71.6	86.0	0.0	70.1	79.4
Pulv Pitot DP	3.60	3.82	2.87	3.50	3.31	0.01	2.52	4.01
PA Mass Flow	3815.	3920.	3568.	3583.	3767.	179.	2972.	4014.
Pulv DP (NOx 0.47)	19.5	19.0	13.4	16.0	19.5	0.0	16.4	15.3
Air to Fuel Ratio	2.21	2.20	1.96	1.99	2.49	9.04	1.81	2.31
Pulv Inlet Temp	285.6	280.9	336.2	305.9	263.5	133.2	372.3	326.8
Pulv Outlet Temp	147.3	149.7	152.8	150.6	145.2	116.3	152.8	150.6
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	2134.	2320.	2111.	2178.	2319.	933.	2093.	2212.
Hyd Skid Pr Setpt	2299.	2363.	2343.	2390.	2050.	1149.	2183.	2294.

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REDUCED AIR FLOW 1½" CUT

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IP12_001736

Printed out for: UNIT1OP - 09-Jan-02 16:09:01

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 16:09:01

Unit 1 875.3 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow333.1TPH	42.3	44.4	44.5	44.9	36.5	0.6	58.5	42.7
Feeder Speed [redacted]	[redacted]	65.3	[redacted]	[redacted]	[redacted]	0.9	[redacted]	63.0
Amps (Duct Pr44.0)	58.0	64.4	60.7	59.4	59.2	0.0	56.7	64.0
Coal Pipe Vel	4198.	4184.	3386.	3795.	4005.	190.	4203.	4266.
PA Flow %	94.2	93.2	75.0	85.0	92.8	4.5	94.2	95.9
PA Damper Pos	79.0	82.8	62.0	65.5	82.2	0.0	98.2	75.3
Pulv Pitot DP	3.57	3.46	2.03	3.12	3.16	0.01	3.93	3.54
PA Mass Flow	3730.	3711.	2996.	3370.	3573.	180.	3736.	3803.
Pulv DP (NOx 0.47)	17.3	17.1	11.6	13.3	17.2	0.0	$\boxed{26.3}$	13.9
Air to Fuel Ratio	2.58	2.52	2.05	2.25	3.02	9.07	1.92	2.67
Pulv Inlet Temp	313.4	290.4	323.3	304.0	311.1	129.9	361.2	317.8
Pulv Outlet Temp	151.9	153.6	147.7	152.8	151.9	114.5	152.3	150.6
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	1920.	2050.	1943.	1964.	2318.	933.	2256.	1870.
Hyd Skid Pr Setpt	1955.	2030.	2034.	2049.	1723.	1149.	2400.	1967.

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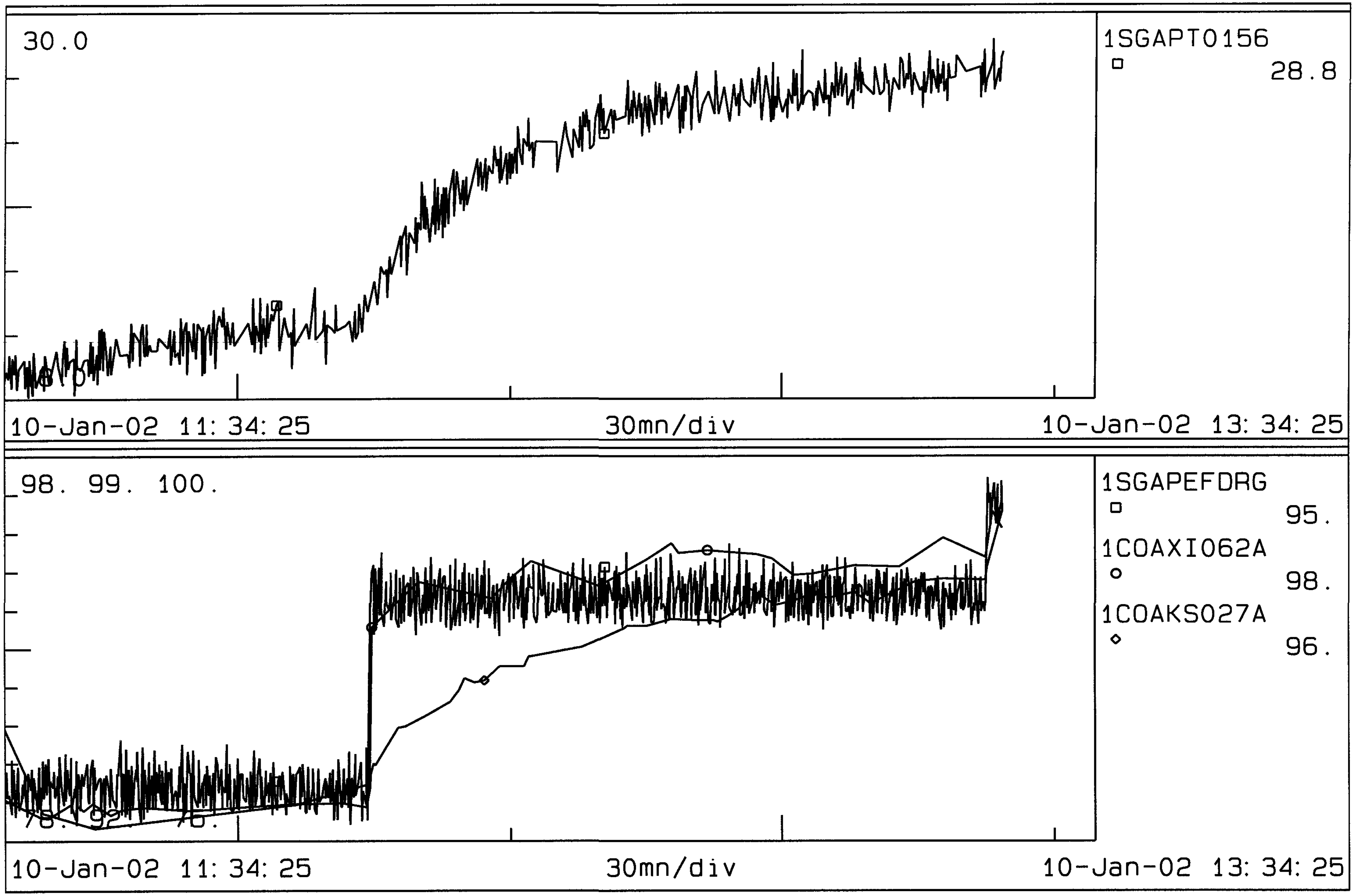

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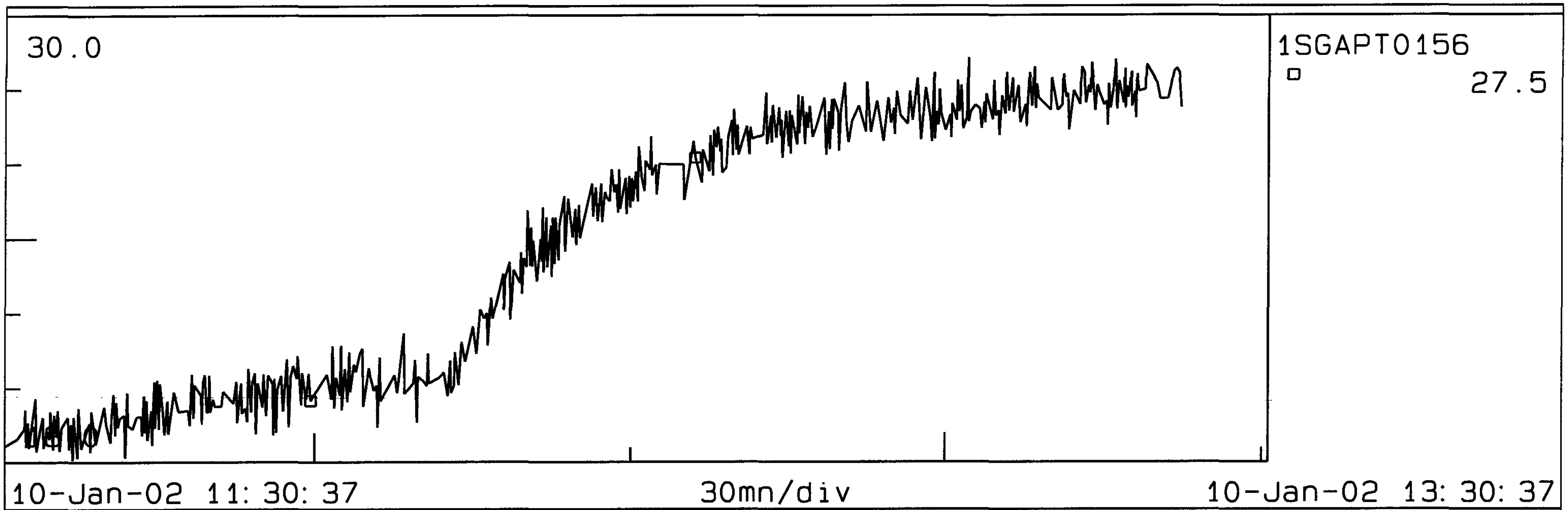
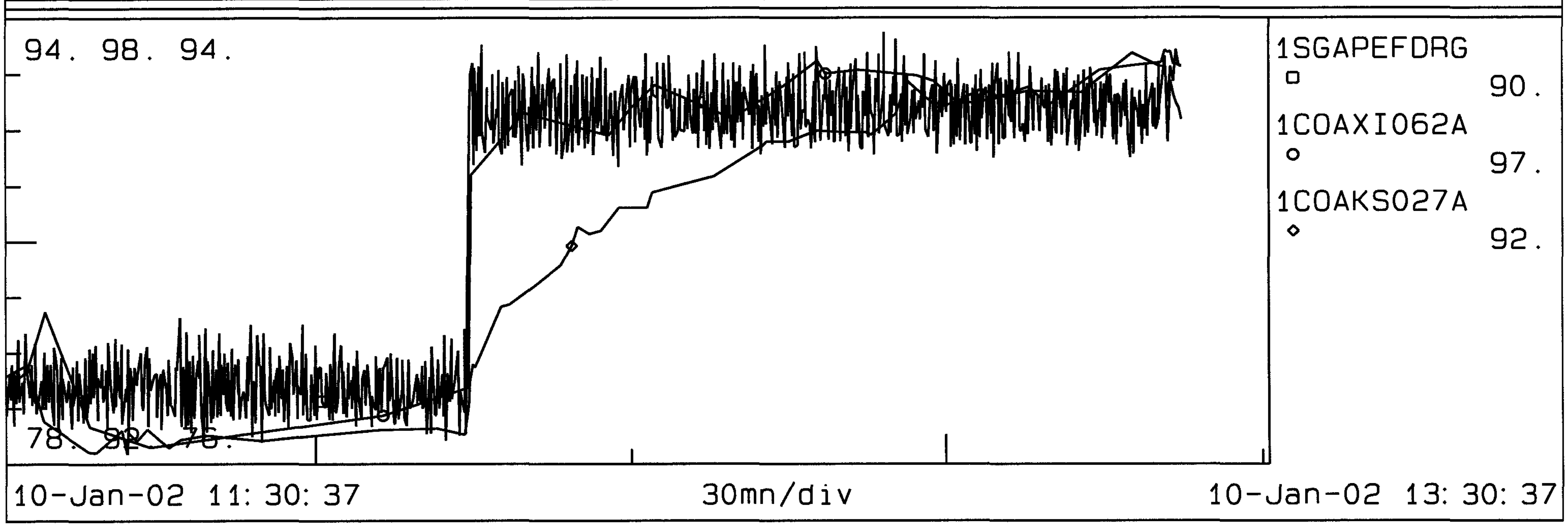
0 Messages U1 Pulv U1 Pulv Operating data 10-Jan-02 13:23:05





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IP12_001739

Printed out for: UNIT1OP - 10-Jan-02 13:38:06

0 Messages U1 Pulv U1 Pulv Operating data 10-Jan-02 13:38:06

Unit 1 873.3MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow329.1TPH	43.8	45.2	45.2	45.9	36.6	45.4	64.5	0.7
Feeder Speed	65.3	66.8	67.2	67.8	55.1	66.7	94.9	1.1
Amps (Duct Pr48.9)	60.2	63.5	70.0	66.2	58.4	50.5	56.9	0.0
Coal Pipe Vel	4169.	4170.	3394.	3796.	4004.	3948.	4145.	0.
PA Flow %	94.6	93.9	76.1	85.8	93.7	89.4	93.5	0.0
PA Damper Pos	71.6	77.7	60.2	62.3	78.3	68.6	99.8	0.0
Pulv Pitot DP	3.51	3.47	2.10	3.19	3.11	3.12	4.03	0.00
PA Mass Flow	3760.	3749.	3066.	3403.	3609.	3561.	3720.	0.
Pulv DP (NOx 0.41)	15.1	14.7	10.8	12.0	15.9	15.9	30.0	0.0
Air to Fuel Ratio	2.59	2.49	2.02	2.22	2.92	2.36	1.74	0.00
Pulv Inlet Temp	289.3	282.7	328.2	306.2	285.2	332.6	400.3	79.2
Pulv Outlet Temp	149.7	151.5	150.1	151.9	150.1	150.6	152.8	88.2
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.0
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	1930.	2074.	2036.	2027.	1597.	2132.	2332.	1022.
Hyd Skid Pr Setpt	2009.	2061.	2061.	2093.	1734.	2067.	2400.	1149.

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Printed out for: UNIT1OP - 10-Jan-02 13:22:24

0 Messages U1 Pulv U1 Pulv Operating data 10-Jan-02 13:22:24

Unit 1 876.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow331.6TPH	44.1	45.8	46.0	46.5	37.2	46.0	62.3	0.7
Feeder Speed	64.8	67.5	67.7	67.9	56.5	67.2	91.6	1.1
Amps (Duct Pr48.5)	61.4	63.2	68.5	65.0	61.0	50.4	56.4	0.0
Coal Pipe Vel	4136.	4184.	3418.	3820.	4011.	3975.	4327.	0.
PA Flow %	94.1	94.4	76.5	86.0	93.6	89.7	97.3	0.0
PA Damper Pos	72.4	78.3	60.7	62.9	78.6	69.4	92.1	0.0
Pulv Pitot DP	3.46	3.52	2.12	3.22	3.11	3.16	4.26	0.00
PA Mass Flow	3733.	3766.	3084.	3435.	3613.	3585.	3882.	0.
Pulv DP (NOx 0.41)	15.4	15.6	11.0	12.4	16.6	16.4	28.4	0.0
Air to Fuel Ratio	2.54	2.47	1.99	2.21	2.85	2.34	1.87	0.00
Pulv Inlet Temp	292.1	288.3	331.3	307.5	287.5	334.2	381.4	78.9
Pulv Outlet Temp	149.4	151.1	149.4	151.5	150.6	149.7	153.0	88.5
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.0
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	1937.	2074.	2038.	2022.	1611.	2133.	2334.	1022.
Hyd Skid Pr Setpt	2021.	2084.	2091.	2118.	1765.	2090.	2400.	1149.

EndTim= 10-Jan-02 13:22:24 /EvalTim= 10-Jan-02 13:22:24 /PanRate= 0

IP12_001741

Printed out for: UNIT1OP - 10-Jan-02 12:13:58
0 Messages U1 Pulv U1 Pulv Operating data 10-Jan-02 12:13:58

Unit 1 873.5 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow329.0TPH	45.4	46.9	47.9	47.2	38.8	46.5	54.8	0.7
Feeder Speed	66.6	68.8	69.7	71.0	56.5	68.3	80.6	1.1
Amps (Duct Pr48.7)	59.2	63.5	73.5	62.0	62.9	48.7	57.0	0.0
Coal Pipe Vel	4266.	4200.	3443.	3825.	4022.	3985.	4095.	0.
PA Flow %	96.0	94.8	76.7	86.0	94.0	90.3	92.7	0.0
PA Damper Pos	73.2	78.8	61.2	63.5	78.4	69.9	77.4	0.0
Pulv Pitot DP	3.59	3.54	2.15	3.22	3.07	3.21	3.78	0.00
PA Mass Flow	3850.	3777.	3109.	3442.	3638.	3592.	3676.	0.
Pulv DP (NOx 0.42)	16.1	16.2	11.0	13.2	17.3	15.8	20.8	0.0
Air to Fuel Ratio	2.55	2.41	2.00	2.17	2.82	2.28	2.04	0.00
Pulv Inlet Temp	289.4	287.5	332.7	308.7	271.7	342.2	363.8	77.8
Pulv Outlet Temp	149.7	151.9	149.4	151.5	148.4	150.4	153.0	88.8
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.0
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	1965.	2138.	2034.	2077.	1667.	2124.	2218.	1020.
Hyd Skid Pr Setpt	2068.	2126.	2159.	2139.	1811.	2111.	2400.	1149.

EndTim= 10-Jan-02 12:13:58 /EvalTim= 10-Jan-02 12:13:58 /PanRate= 0

IP12_001742

Printed out for: UNIT1OP - 09-Jan-02 16:10:54

0 Messages U1 Pulv U1 Pulv Operating data 09-Jan-02 16:10:54

Unit 1 876.0 MW	Pulv A	Pulv B	Pulv C	Pulv D	Pulv E	Pulv F	Pulv G	Pulv H
Coal Flow327.0TPH	43.6	45.3	45.2	46.0	37.1	0.6	57.9	43.5
Feeder Speed [redacted]	[redacted]	66.9	[redacted]	[redacted]	[redacted]	0.9	[redacted]	64.2
Amps (Duct Pr44.0)	58.0	63.7	65.2	57.7	57.4	0.0	57.7	62.5
Coal Pipe Vel	4233.	4181.	3390.	3813.	4051.	190.	4156.	4273.
PA Flow %	95.6	93.7	75.7	85.1	93.8	4.5	93.8	95.9
PA Damper Pos	78.5	82.7	62.4	65.6	81.7	0.0	98.1	75.3
Pulv Pitot DP	3.62	3.43	2.11	3.11	3.19	0.01	3.90	3.57
PA Mass Flow	3760.	3706.	3034.	3385.	3578.	180.	3691.	3801.
Pulv DP (NOx 0.46)	16.2	16.4	10.5	12.8	16.1	0.0	26.0	13.0
Air to Fuel Ratio	2.59	2.44	1.99	2.23	2.94	9.07	1.88	2.59
Pulv Inlet Temp	301.0	280.5	334.8	299.1	304.2	129.6	362.7	318.1
Pulv Outlet Temp	152.8	154.1	148.1	153.1	156.3	114.5	152.8	151.9
Coal Bias	-3.8	0.0	0.0	0.0	-12.	0.0	0.0	-3.7
Air Bias	10.1	7.8	0.0	0.0	13.3	3.5	0.0	12.1
Hyd Skid Pr Fdbk	1920.	2050.	1975.	1971.	2319.	933.	2256.	1900.
Hyd Skid Pr Setpt	2002.	2066.	2062.	2097.	1755.	1149.	2400.	1998.

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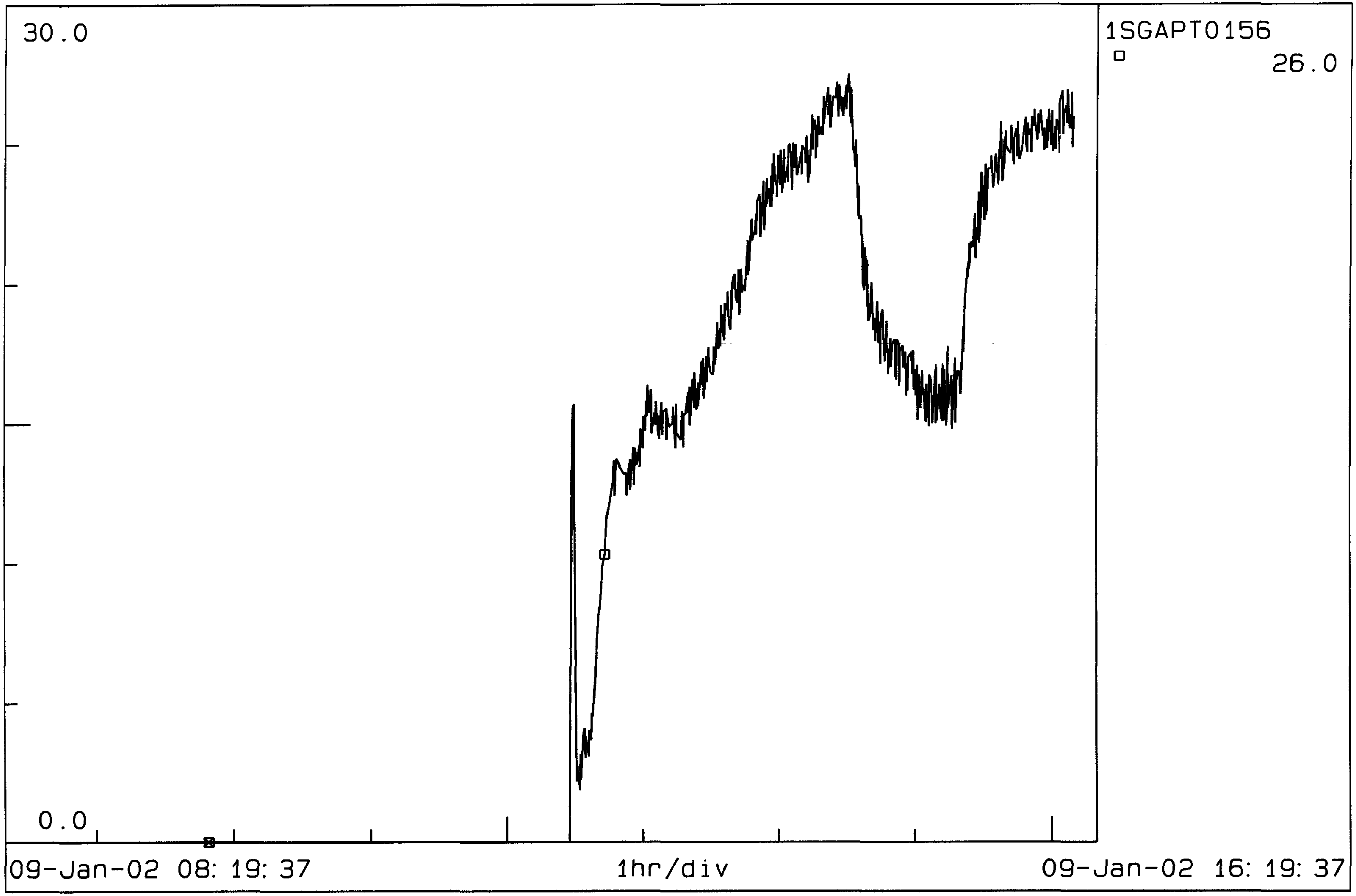

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